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26 July 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Jerry C. Winslow
Xcel Energy
414 Nicollet Mall (RS-8)
Minneapolis, MN 55401

Re: Ashland / Northern States Power Lakefront Superfund Site
Administrative Order on Consent / CERCLA Docket No. V-W-04-C-764
Comments on the Draft RI/FS Work Plan dated February 18 2004

Dear Mr. Winslow:

In accordance with the Administrative Order on Consent (AOC), CERCLA Docket No. V-W-04-C-764, Appendix A, Statement of Work (SOW), Part III. 1. C and D., the United States Environmental Protection Agency (EPA) hereby disapproves the Draft RI/FS Work Plan. We have provided very prescriptive comments, recommendations, and suggestions to assist Xcel Energy in revising the document. We recommend a technical working meeting as soon as possible to discuss the comments, recommendations, and revisions with Xcel Energy and to assist Xcel Energy with the revisions. Certainly, if Xcel Energy does not agree with certain revisions, we will discuss them and come to a resolution at the meeting.

We also suggest that Xcel Energy need not expend the effort to respond to each comment individually, in writing, by separate letter. We can assign a party to take descriptive notes at our meeting which will provide the record of Xcel's responses to the comments.

It would be best if all technical reviewers could attend this meeting, which would include, EPA, the Bad River Band of Lake Superior Tribe of Chippewa Indians, the Red Cliff Band of Lake Superior Tribe of Chippewa Indians, Wisconsin Department of Natural Resources, and the National Oceanic and Atmospheric Administration. Please note that at the time of this letter, EPA has not received written comments from the Red Cliff Band. However, we believe that all of our comments together reflect the concerns of the Red Cliff Band, based on previous conversations. However, we would like to ensure that the Red Cliff Band's comments are fully addressed and we propose that the Red Cliff Band provide any additional comments they may have at the technical meeting.

Our hope is that our comments and recommendations will simplify the document Xcel Energy has submitted (we recommend merging some sections and removing information that is not typically part of a Work Plan) and serve to streamline the sampling program.

In accordance with the AOC, paragraph 23, Xcel Energy would resubmit a revised work plan to address the comments, within 21 days of receipt of this letter (or other period hereby specified). Since we seek to address our comments with Xcel via a meeting and work with Xcel in revising the Work Plan, EPA recommends that we meet within 21 days of receipt of this letter, or as soon as possible, based upon all o f the technical personnels' schedules. Our goal at the meeting is to discuss the comments, and make the revisions during the meeting, so at the end of the meeting, our meeting product is a Revised Work Plan. Within 21 days of the meeting, the appropriate revisions to the Field Sampling Plan (FSP) and Quality Assuarance Project Plan (QAPP) should be made and submitted. To the extent possible, EPA requests that Xcel Energy review the comments prior to our meeting, and revise the FSP and QAPP ahead of time, to the extent it can.

Please contact me at your earliest convenience to schedule the meeting. I will contact all of the technical reviewers to assess their availabilities through the month of August.

Sincerely,

Sharon Jaffess

Sharon Jaffess, Remedial Project Manager
Superfund Division

cc: James Dunn, WDNR
Kirsten Cahow, Bad River Band
Charlotte Dawn, Red Cliff Band
Jennifer Lawton, NOAA

WORK PLAN COMMENTS

Executive Summary, Pages ix – xiv: Xcel Energy and WDNR are in disagreement concerning certain historical facts regarding potentially responsible parties (PRPs)/wood treatment and the original sources of the contaminants found on the Site. EPA has not fully evaluated the data, historical information, or historical investigation work with regards to the existence or non-existence of wood treatment on the property as of this date. Additional data collected pursuant to this Work Plan is expected to provide necessary information to ascertain different waste streams. Since the specific information and details provided in the Executive Summary are not pertinent to an RI/FS Work Plan, EPA prefers that this section be deleted, rather than request revisions or modify the section.

Instead, EPA requests that Xcel Energy provide a separate report to EPA on its PRP search efforts to date. In phase with this project, and through a separate track, EPA will evaluate Xcel Energy's information and findings, and the current and new data set, to assess other potentially responsible parties. If EPA deems it appropriate, additional PRPs will be issued notification pursuant to Section 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund) (P.L. 96-510) as amended by the Superfund Amendments and Reauthorization Act of 1986 (P.L. 99-499).

Section 1.1 Purpose, Page 1-1: Delete this paragraph and replace with:

This Work Plan describes the procedures and tasks necessary to complete the Remedial Investigation and Feasibility Study at the Ashland/NSP Lakefront Site in accordance with the Administrative Order on Consent, CERCLA Docket No. V-W-04-C-764. This Work Plan builds upon previous data and information, as well as reports prepared by both WDNR and Xcel Energy.

Section 1.2 Objectives, Page 1-1: Delete this paragraph and replace with:

This Work Plan has been prepared in accordance with CERCLA as amended by SARA, and the National Contingency Plan (NCP). Since the Site has been the subject of similar groundwater, soil, sediment, and air investigation work conducted under State of Wisconsin regulations, this work plan need only address certain data gaps and assessment work required under CERCLA as amended by SARA and the NCP. Specifically, data is needed to:

1. Define the horizontal and vertical extent of groundwater contamination, both dissolved and non-aqueous phase liquids (NAPLs) in the man-made land surface (fill), the till and lake deposits which underlie man-made fill (varying between approximately 5 to 50 feet in thickness and known as the Miller Creek Formation), the sand and gravel deposits below the Miller Creek Formation (known as the Copper Falls Formation which is approximately 100 feet in thickness), and the sandstone bedrock of the Oronto group underlying the Copper Falls Formation, and its interaction with Chequamegon Bay.

2. Refine the quantification of sediment contamination (and its horizontal and vertical extent) in the Chequamegon Bay inlet and discuss the hypothesis that the sediment contamination is limited to the inlet and has not migrated (either via surface water transport or bed load transport) beyond the current construed site boundaries. That is, with existing information, analyze sediment stability and contaminant transport mechanisms in the inlet. Or, discuss the data gaps and the purpose of this study to address such data gaps. Data collected to date indicate that the horizontal extent of contamination is approximately 10 acres within the embayment formed by the marina jetty and the former lumber docks. However, there is also some more recent data collected that indicates contamination outside of this area – which may actually be indicative of a spreading of contaminants.

3. Define the surface water impacts from the sediment contamination (the potential for dissolved phase transport off of the contaminated sediments into the water column) as well as any other impacts to surface water from potential migration from ground water into the surface water or from runoff from the surface soils.

4. Define the horizontal and vertical extent of the coal tar and other contaminants in the surface and subsurface soils.

In addition, this Work Plan outlines the process for:

1. Revision of the existing conceptual site model pursuant to information derived from the upcoming field work;

2. Revision of the existing baseline human health and ecological risk assessments pursuant to the data from the upcoming field work;

3. Preparation of a Remedial Investigation Report which utilizes preexisting data and the data collected as part of this Work Plan;

4. Preparation of the following: Remedial Acton Objectives Technical Memorandum; Alternatives Screening Technical Memorandum; Comparative Analysis Technical Memorandum; and Feasibility Study Report;

This Work Plan also includes review of previous treatability study work and performance of additional treatability study work, if EPA deems such work necessary.

<u>Section 2.1.1 Site Description Page 2-2, Paragraph 1:</u> Insert the words "Based on current data," in front of the first sentence "The impacted area of Kreher Park..."

<u>Section 2.1.1 Site Description Page 2-2, Paragraph 2:</u> It is stated that "Contaminated sediment levels quickly decline beyond this boundary." Please revise this to: "Data collected to date

indicate that contaminated sediment levels may decline beyond this boundary." Incorporate another figure that shows this inlet, the locations of previous sampling points, and the current known horizontal extent of contamination. Indicate on this map whether the zones that are shown as clean are known to be clean by a sampling event, or if the location has not yet been sampled, and/or what the method detection limits were.

Another figure showing this area in cross section should depict the vertical extent of contamination. Also describe the vertical extent of previous sampling events (sediment core depths).

In the last sentence, it is stated that the contaminated sediments in the embayment encompasses approximately **nine** acres. Other reports state it to be **ten** acres. We should be consistent and clarify whether the contaminated zone, currently defined, is nine or ten acres. Another suggestion is to simply state that it is **approximately ten acres**.

Section 2.1.1 Site Description Page 2-2, Paragraph 3: Delete this paragraph. While previous reports coined the terms "Areas of Concern" or "Operable Units," and we have had discussions concerning these terms, these terms tend to make the previous reports and this version of the Work Plan confusing and overlying complicated. That is, it would be preferable to simply refer to the contaminated media, and the known contaminant source areas, and the possible contaminant source areas, as well as secondary sources (e.g., DNAPL zones) without using these other terms, which have specific meanings within the statute, as described below (for your information).

> CERCLA as amended by SARA defines the term on-site as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action."
>
> CERCLA as amended by SARA defines operable unit as a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may also address geographical portions of a site, specific action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site.

As described above, previous investigators have separated out different geographic areas of this site as described in the text: Kreher Park and ravine or lower ravine area, subsurface geologic formations, the contaminated sediment in the inlet of Chequamegon Bay, and the location of the original manufactured gas plant (the Upper Bluff) and referring to these as "Operable Units" and more recently we've been describing them as "Areas of Concern." "Area of Concern" is a term borrowed from another regulatory program, the Resource Conservation and Recovery Act (RCRA).

Based upon commentary from various readers of the draft work plan, using such terms and dividing up the site in this way, makes the document difficult to follow and confusing. EPA prefers to define this Site based on the legal property description and on the basis of the known extent of contamination. This is direct and clear and doesn't require us to view the geologic formations as separate operable units or areas of concern.

The figures that show the current known extent of contamination on the Site are extremely helpful and should be retained in the document.

One purpose of the study is to use our previous knowledge concerning source areas (e.g., the manufactured gas plant and its legacy coal tar and ascertain the rate and extent of the migration of that coal tar and associated contaminates through the groundwater). Other contaminant source areas may be locations within the former lumber mill operations, and the former solid waste disposal areas (the landfilled areas between the current lake shore and the bluff). Coal tar originating from the former MGP facility and possibly contaminants from landfilling and work conducted on the present park and near shore areas are possibly the contaminant source areas.

Ground water is known to be contaminated beneath the former MGP, and beneath the park areas. Contamination extent and depth in the aquifers are not known as of the writing of this Work Plan. That is why additional work is necessary for this project. Additional data collection (e.g., test pits, soil borings, pore pressure measurements, ground water sampling) described in this Work Plan will define all of the source areas, the extent of contamination, and the manner in which it is migrating (e.g., source area into soil, from soil into ground water, and transport possibly into surface water and sediment and specifically where it is and where it is or isn't migrating. For example, is the coal tar present within the soil and ground water in the upper bluff area spreading only within the upper bluff area or is it migrating down into deeper geologic formations and present in the geologic formation beneath the ravine and park land? Is material from the upper bluff finding its way into surface water through surface water transport? Is contamination beneath the park area a mixture of MGP waste and other landfill material waste? Is the contaminated sediment also from a mixed waste stream?

To make the document easier to follow, the details regarding the geologic formations should be moved to the section on geology.

<u>2.1.2 Site History, Page 2-3, Paragraph 2</u>: Revise the sentences starting at "The filled area was used for lumbering and sawmill activities by a number of lumber companies…." as follows:

The filled area was used for lumbering and sawmill activities by a number of companies: Barber Mill (1884 – 1887), W.R. Sutherland Mill (1887 – 1897), Pope Lumber (1897 -1901), and John Schroeder Lumber (1901 – 1939). The lumbering and saw mill activities occurred during the deforestation of the northern portion of Wisconsin around the turn of the century. Logs were floated into the Ashland area on Chequamegon Bay. A log boom extended into the bay from which logs were extracted from the water for processing into lumber products. Historic photographs indicate that railroad ties were among the products produced at the lumber yard. In addition, the John Schroeder Lumber Company made reference to the manufacturing of wood preservatives and products in its Articles of Incorporation. Anecdotal information, and research conducted by Xcel Energy indicates that there may have been structures used for creosote/coal tar dipping or treatment of railroad ties, telephone poles, and the like in the west-central area of the present Kreher Park area. Additionally, oil houses (the functions of which are unknown) were located in the east central part of Kreher Park.

(Note: such information, or copies of documents which provide such details can be incorporated into the section or included in an appendix).

The area remained vacant for approximately 23 years after the end of lumber mill operations. In 1942, Ashland County transferred title of the land to the City of Ashland. Anecdotal information indicates that the area was vegetated at this time, and there may have been a ponded area of a black tarry substance during at least a portion of this time interval. A 1953 map prepared by Greeley and Hanson Engineering (the design engineer for the City of Ashland's original Waste Water Treatment Plant) indicates a "Coal Tar Dump" was present at this time. Anecdotal information also indicates that the property was used as a "dump" for solid waste, fly ash, and dredge spoils by property owners, residents, and the United States Army Corps of Engineers.

In 1951, the City of Ashland constructed its Waste Water Treatment Plant (WWTP). It operated until 1989. During the mid-1980s, the marina extension of Ellis Avenue was completed to permit establishment of a marina with full service boat slips, fuel and dock facilities and a ship store

(Note: is there information concerning the jetty? Was it a preexisting structure or was it built in the mid-1980's? If it was built in the mid-1980's would we expect more contamination like currently exists in the inlet to be found on the marina side? What about the other side by the swimming beach? When was that jetty built?)

In 1989, during exploratory work to expand the WWTP into the Kreher Park area, contaminated soil and groundwater was encountered by the City of Ashland. The City notified the Wisconsin Department of Natural Resources (WDNR), and subsequently closed the WWTP, relocating the current facility a few miles away to the northeast. In 1994, WDNR initiated an investigation and evaluation of the area to characterize the extent of contamination on the property.

Section 2.1.2 Site History, Page 2-3, Paragraph 3: Delete the text as it has been replaced by the text, above.

Section 2.1.2 Site History, Page 2-4, Paragraph 1: Delete the text as it has been replaced by the text, above.

Section 2.1.2 Site History, Page 2-4, Paragraph 2: In the sentence that begins with "Fairly extensive records..." insert "to the State of Wisconsin Railroad Commission" after the word "reports."

Section 2.1.2 Site History, Page 2-4, Paragraph 4: Insert the following as the beginning of the paragraph:

The MGP changed ownership over the years: Ashland Light, Power and Street Railway Company (1887 – 1922); Lake Superior District Power Company (1922 – 1983), Northern States Power Company (1983 – 1999), Xcel Energy (1999- Present).

The MGP was operated as a coal-gas facility until at least 1909, when evidence of both coal gas (coal feed stock) and carbureted water gas (oil feed stock) retorts are present in historic drawings. A transition from coal-gas to the Lowes carbureted water gas process appears to have occurred sometime between 1895 and 1923. Between 1923 and 1947, it appears that only the carbureted water gas process was used at the facility. After 1947, the carbureted water gas process was retired in favor of liquid petroleum (propane). It should be noted that coal tars were produced as a normal co-product of gas manufacturing. Only three years of data were found thus far, concerning the disposition of the coal tar product during the years the plant utilized coal. Limited records indicate that coal tar product was sold and also used on site for energy recovery. Based on gas production records and the aforementioned records on coal tar, it is estimated that approximately 590,000 gallons of coal tar were produced between 1900 and 1947. Of this, it is estimated that approximately 410,000 gallons were sold, leaving 180,000 gallons unaccounted for. A portion of the unaccounted tar may have been used for roofing, fuel, or other purposes.

Section 2.1.1 Site History, Page 2-5, Paragraph 2, Sentence 2: Revise to read: "A 12-inch clay tile pipe..." After that sentence, insert: "The clay tile pipe was traced up the ravine to the area of the MGP."

Section 2.1.1 Site History, Page 2-5, Paragraph 2, Sentence 3: Insert the word "NAPL" after the word "groundwater" and insert "clay tile pipe buried in the" in front of the words "former ravine."

Section 2.1.1 Site History, Page 2-6, Paragraph 1: Delete the word "eliminate" and replace with "cap." Insert another sentence as follows: Capping the seep was necessary to address a direct contact threat with oil/tar contaminants.

Section 2.1.4 Summary of Previous Investigations, Pages 2-9 through 2-19: Revise as follows (revisions are in **bold**):

WDNR's contractor, SEH, produced several documents from 1995 through **2003**. SEH concluded in its 1998 remedial action options report (RAOR) that the primary source of contamination at the property was caused by releases from the historic MGP.[1] This was based in part, on the following:

- The identification of MGP appurtenances such as former gas holders and storage tanks shown on historic Sanborn maps;
- The physiographic location of the MGP in relation to Kreher Park (on an up gradient bluff overlooking the park area);
- The identification of a former ravine that transected the MGP site and **discharged directly to the bay prior to the filling of the lakebed and later,** onto the park area **and through a ditch referred to as an open sewer directly to the bay,** during its operating life that may have been a pathway for contaminants; and
- The identification of a 2-inch diameter pipe on the former MGP property on Greeley and Hansen engineering drawings for the 1951 construction of the WWTP. This pipe, labeled by Greeley and Hansen as *"2" Tar to For. Dump,* was shown in cross-section and plan view crossing beneath St. Claire Street, and appeared to align with and lead to the location of an area labeled as "waste tar dump" shown on the Greeley and Hansen drawings north of the former seep area at Kreher Park.

As previously described, D&M/URS investigated the Xcel Energy property to characterize the extent of contamination beginning in 1995. Additionally, historical research on the operation of the MGP was also performed. The findings of this work were described in the Supplemental Investigation and Remediation Action Options Report for the Xcel Energy property (March 1999). The salient information from this report as well as earlier studies is as follows:

- Releases of coal tar product occurred during the lifetime of the MGP. DNAPL was found in the form of coal tar contaminated soils at the base of the former ravine below the water table **for the full length of the ravine (see boring logs B 20 through 22).**
- The MGP operated primarily as a manufacturer of water gas or associated derivatives from about 1885 to 1947. This process resulted in a lack of nitrogen containing compounds (e.g., cyanides, phenols) found at other gas plant sites that used coal carbonization methods;
- The **by**-product consists primarily of coal tar /**oil** residue. Other typical MGP by-products (purifier box waste, clinker waste, etc.) are not predominant. This is consistent with the MGP process discussed above;
- DNAPL is found in a confined aquifer below a clay unit (the Miller Creek formation) directly beneath the former MGP. This confined aquifer (the Copper Falls formation), does not **seem to** have a hydraulic connection with the fill aquifer at Kreher Park **but additional data is needed to assess this;**

- Groundwater discharged **at** the mouth of the former ravine, **in the past through the 12" clay tile pipe,** onto Kreher Park; coal tar **NAPL and dissolved phase** contamination is present in this groundwater. **Current data indicates that the** levels **are** several orders of magnitude below what is measured either at up gradient wells south of St. Clair St., or at down gradient wells at Kreher Park;
- The ravine was backfilled with uncontrolled fill (clay, cinders, and brick) by 1909; and
- The alleged 2" Tar Pipe, as labeled by Greeley and Hansen post-hoc, was investigated during the fall of 1998. The Greeley and Hanson drawings, as well as Xcel Energy historical drawings, identified an underground pipe that began and ended on the Lake Superior District Power (LSDP – a predecessor to Xcel Energy) property. No indication of it is shown on any drawings that depict conditions at Kreher Park **found thus far**. Additionally, the 1998 field investigation found an approximate 2" metal pipe along with two additional pipes that were known to transport propane below St. Claire Street following closure of the MGP. A section of this pipe was analyzed by a metallurgical firm, Crane Engineering and Forensic Science (Crane) in Minneapolis, Minnesota. Crane concluded that the pipe was manufactured between 1920 and 1940 and likely carried water, steam or compressed air. There was no physical indication or residue of hydrocarbon **remaining on that section of the pipe. It is unknown whether or not it historically carried hydrocarbons, but, this analysis suggests that it didn't. However, it is not definitive evidence.** Appendix C of the D&M/URS March 1999 Remedial Action Options Report for the Ashland Lakefront Site includes the Crane report.

Investigations of the **seep area conducted by WDNR/SEH in February 2001** identified the **former 12"** clay tile **pipe** that was the likely source of the seep discharge. **Subsequently, XCEL/URS continued to trace the pipe** found at the base of the ravine from the seep along the entire ravine axis, leading to the area of the former MGP. The crushing/removal of short segments of the tile during the 2001 investigations, the installation of the extraction well at the base of the ravine on the north side of the gravel storage yard (at the former ravine mouth) in May 2002, and the installation of the low permeability cap at the seep has essentially eliminated further **discharge of contaminated water and NAPL to the surface at the seep area.**

The following is a list of reports and related documents performed by SEH and others at the Kreher Park and Bay Sediments site:

Note: just add in this one report:

- ***Technical Outreach Services for Communities (TOSC) Review of Short Elliot Hendrickson, Inc. and Dames & Moore Ecological Risk Assessments of Contaminated Offshore Sediments in Ashland, Wisconsin May 14, 2001, by Dr. Christopher Marwood.***

Section 2.2.2.2 Storm Water/Surface Water Conditions Page 2-21, Paragraph 2: Revise as follows (see bold):

Information provided by the City of Ashland's Department of Public Works indicates that the City had a combined storm and sanitary sewerage system until the early to mid 1980's. The storm sewer system was separated from the sanitary system at that time to reduce flow to the former WWTP. **In the past, storm water discharged directly to Chequamegon Bay through three known outfalls within the Site. Those outfalls have been closed and stormwater is now re-routed to a discharge point east of the site. (A map showing the route of stormwater discharge as it relates to the site should be incorporated).**

Section 2.2.2.3 Site Geology and Hydrogeology, Page 2-22, Paragraph 2: Revise the following sentence as indicated in **bold**: The ravine fill unit consists of silty clay fill material mixed with ash, cinders, slag, and fragments of bricks, concrete, glass, wood, **and other solid waste. It is also possible that solid waste was also placed in the northwest portion of Kreher Park.**

Section 2.2.2.3 Site Geology and Hydrogeology, Page 2-22, Paragraph 3: Insert the following at the end of the paragraph: **The thickness of the Miller Creek Formation below the bay is unknown.**

Section 2.2.2.3 Site Geology and Hydrogeology, Page 2-23, Paragraph 1: Revise as follows (changes in **bold**): The Copper Falls Formation underlies the Miller Creek Formation, and consists of granular, cohesionless material deposited by glacial melt waters. **Bedrock was encountered at 192 feet during the latest exploration drilling program at the Xcel Energy property during December 2003 (monitoring well MW-2C). Bedrock in the Ashland area consists of Precambrian sandstones.** To the south, beneath the Xcel Energy facility, the Copper Falls consists of silty sands with discontinuous lenses of silty clay and silt. To the north, beneath Kreher Park, the Copper Falls formation consists of outwash sediments (i.e., clean sands with occasional gravel intervals).

Section 2.2.2.3 Site Geology and Hydrogeology, Page 2-23, Paragraph 4: Revise as follows (changes in **bold**): At Kreher Park, the groundwater "seep" formally located north of the mouth of the backfilled ravine discharged water **and contaminants from the MGP area** to the surface **through a 12" clay tile pipe** with variable flow, depending on rain events and seasonal conditions. The elevation of the seep was over five feet above the water table levels measured in MW-7, which is located immediately adjacent to the seep. As described above, the buried pipe was located and the seep area **capped** as part of the 2002 interim action response.

Section 2.3.1, Upper Bluff/Filled Ravine, Page 2-25, Paragraph 1: Revise as follows: The highest levels of soil contamination were detected within several feet of the surface in the vicinity of the former MGP located south of St. Claire Street. Preexisting site data indicates that soil contamination is limited to the former ravine. However, this information must be qualified by the fact that samples have not been taken elsewhere and there may or may not be contamination in other locations. The fine grained low permeability Miller Creek formation helps to restrict/slow down the spread/migration of contaminants. The concentrations of contaminants decline with depth at several sample locations. Residual contaminant levels (RCLs) listed in ch. NR 720, WAC, for arsenic and coal tar constituents (benzene, toluene, xylene, acenaphthene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, and phenanthrene) were exceeded in soil samples collected from the Xcel Energy property.

Section 2.3.1 Upper Bluff/Filled Ravine, Page 2-26, Paragraph 1: Insert the following after the last sentence: "The interim recovery system appears to be working though it isn't confirmed as to whether the level of DNAPL in the wells has dropped because of the pumping, or because of well bailing."

Section 2.3.2 Copper Falls Aquifer, Page 2-26: Replace the term "DNAPL" with the term "NAPL."

Section 2.3.2 Copper Falls Aquifer, Page 2-27, Paragraph 2: Insert at the end of the paragraph: "The decline in DNAPL thickness may be due to the operation of the coal tar recovery system or the quarterly bailing and slow recovery of those wells."

Section 2.3.2 Copper Falls Aquifer, Page 2-28, Paragraph 1: Replace the term "DNAPL" with the term "NAPL."

Section 2.3.4 Chequamegon Bay Inlet, Page 2-29, Paragraph 1: Revise as follows (see bold): Kreher Park has been identified during previous investigations. Contaminated near-shore sediments are located within the inlets created by the jetty extension of Prentice Avenue to the east, and the marina extension of Ellis Avenue to the west. **Constituents of concern identified from previous investigations include the same VOC and PAH compounds found in the soil and groundwater of Kreher Park and the MGP property.** However, the concentrations of contaminants in sediment are higher and more widespread than those found at the park **thus far**. These levels are generally higher than the solubility limits for the subject compounds, indicating free-product is present. **Perhaps this is due to the fact that the inlet was subject to some direct discharge and the subsurface is being contaminated overtime through the spread of the plume through groundwater.**

Section 2.3.4 Chequamegon Bay Inlet, Page 2-29, Paragraph 2: Replace 7 acres with 10 acres, or alternatively, "approximately 10 acres."

Section 2.3.4 Chequamegon Bay Inlet, Page 2-29, Last Paragraph: The last sentence indicates that the extent of low level PAHs is greater than anticipated previously. Can this be quantified or delineated based on preexisting data?

Section 3.1 Types and Volumes of Waste Present, Page 3-1: It is stated with certainty that waste present in Kreher Park is also due to "lumber treatment." This has not yet been ascertained. It would be more accurate to state the following: "Contaminated soil, groundwater and sediments resulting from MGP operations, historic waste disposal practices, and lumber mill operations (possibly wood treatment) are present at Kreher Park."

Section 3.1 Types and Volumes of Waste Present, Page 3-3, Paragraph 2: Revise as follows (revisions in bold):

Figures B-1 through B-10 (Appendix B) show the distribution of total PAHs and naphthalene on a recent aerial photo (1998) in the sediments. As previously described in Section 2.3.4, the highest levels of contaminants **appear to be** in the lobe of the inlet south of a line from the WWTP west to the marina, north of the WWTP, and along the shoreline east of the marina. This pattern closely mimics the shape of the shoreline. **This may be due to the way the contaminants were originally introduced into the inlet (e.g., through discharges all along the shoreline frontage, either through upwelling of groundwater or some other discharge mechanism) or it represents local contaminated sediment transport / erosion / and redeposition from a point source discharge or numerous point source discharges, or a combination of both. In summary, data collected to date indicates that the bulk of contamination in Chequamegon Bay appears to be confined to the nearshore (within 700 feet) environment north of the Asland Lakefront property. Though, additional samples outside of this zone do indicate that contamination may be more widespread. The mapped horizontal extent roughly follows the configuration of the north shoreline of the property. Visual observation during sampling of sediment beyond 700 feet north of the shoreline did not indicate presence of contaminated sediment, though chemical analysis shows the presence of PAHs; therefore, it is present, but is not visually observed. The distribution of**

contaminated sediment in the bay is possibly due to periodic resuspension of the sediment caused by bioturbation, wave action and seiche effect and the lateral transport of contaminants and sediment by longshore or littoral currents. The contaminated sediment appears generally to be concentrated at the wood debris/sediment-water interface where wood waste is present. Concentrations generally decrease with depth. The presence of contaminated sediment and apparent NAPLs at the sand-wood waste interface is consistent with the physical-chemical characteristics of the contaminants. The distribution pattern of contaminants in the bay, and the minimal sedimentation above the wood is consistent with periodic resuspension and redeposition physical processes likely occurring in the bay.

(Note Figures B-5 and B-6, which are cross-sections through the sediments east and west of the WWTP. Figure B-7, which is the east/west cross-section, shows the highest contaminant levels near the sediment surface. Figure B-5, the north/south cross-section east of the WWTP, shows the highest levels at deeper intervals.)

<u>Section 3.1 Types and Volumes of Waste Present, Page 3-3, Paragraph 3:</u> Delete the sentence starting with "These volumes were peer reviewed..." because this peer review does not meet the requirements of a US EPA peer review as described in EPA 100-B-00-001, December 2000, Science Policy council Handbook, Peer Review.

<u>Section 3.0: General Comments:</u>
This section should be expanded and revised and could possibly be merged with Section 2.0 instead, so that the Work Plan is not repetitive and duplicative. The recommended format is as follows:

3.0 Initial Evaluation
- 3.1 Review of Existing Data
  - 3.1.1 Drainage and Surface Water Quality
  - 3.1.2 Hydrogeological Characteristics
    - 3.1.2.1 Regional Geology and Hydrogeology
    - 3.1.2.2 Site Specific Bedrock Hydrogeology
  - 3.1.3 Climate
  - 3.1.4 Population and Land Use
  - 3.1.5 Characteristics of Chemical Contaminants
    - 3.1.5.1 Distribution of Contamination
    - 3.1.5.2 Known and Potential Source Areas of Contamination
    - 3.1.5.3 Chemical Characteristics of Surface Soil
    - 3.1.5.4 Chemical Characteristics of Subsurface Soil
    - 3.1.5.5 Chemical Characteristics of Surface Water

3.1.5.6 Chemical Characteristics of Sediment
3.1.5.7 Chemical Characteristics of Groundwater (including NAPL and DNAPL)
3.1.5.8 Chemical Characteristics of Air

That is, take the information from Section 2 on "site background" and put it in the context of this initial evaluation and review of existing data. Clearly discuss what is known about the contamination itself, and what is known about how that contamination affects each medium (surface water, groundwater, sediment, and air). Since limited work was conducted in different areas, that is, beneath the MGP, beneath Kreher Park, within the inlet of Chequamegon Bay, each area's contaminated media can be described in a separate section on each physical area. But, in general, it should be described as what is known about soil, sediment, and groundwater contamination in the area as a whole and what is known about the original source areas (the MGP plant, potential landfill areas, etc.) and contaminant migration into the lake via subsurface/surface/pipe flow and migration through what is currently a residential neighborhood, Kreher Park, and a marina.

Therefore, this section should clearly delineate exactly what **is known** and what is **not known** about the Site and the contamination **based on the existing data set**, and all of the previous reports written. This section should be clear as to what data needs to be collected by virtue of this Work Plan in order to quantify risk, define the extent of contamination, understand the migration of contaminants, and have the information necessary to propose and evaluate remediation options so as to ensure that all source areas are addressed.

The following text is recommended. As previously stated, please note that it would be acceptable to merge the information in sections 2 and 3 as this could simplify the work plan, making it more clear and direct.

3.0 Initial Evaluation

3.1 Review of Existing Data

3.1.1 Drainage and Surface Water Quality

The Site is located on the shore of Chequamegon Bay. Regional surface water drainage flows to the north through Fish Creek and several small unnamed creeks and swales into Chequamegon Bay. Surface water at the Site flows either to the City of Ashland storm sewer system, or disharges directly to Chequamegon Bay. An open sewer is depicted on historic Sanborn Fire Insurance maps dating from 1901 to 1951. It is not clear whether the open sewer was used for stormwater or sanitary water discharge to Chequamegon Bay. The surface water quality in Chequamegon Bay has not been assessed in previous studies. However, the physical-chemical characteristics of the sediment previously sampled suggest that concentrations of contaminants in sediments would be higher than the concentrations in the overlying water column. The high specific gravity, low solubility, and affinity for adsorption to sediment will tend to concentrate these contaminants in the sediment. The PAH and VOC contaminated sediment is concentrated at the wood debris/sediment-water interface and concentrations generally decrease with depth. The presence of contaminated sediment and NAPLs across the surface of the lake bed is consistent with the physical-chemical characteristics of the contaminants. The mode of contaminant transport to sediments was likely through subsurface seeps, historic surface water runoff, or possible discharge of contaminants from one or more source areas (e.g., MGP plant, coal tar dump, etc.) through the historic open sewer. Surface water samples will need to be collected to verify the hypothesis about the presence/absence of surface water contamination (in addition to the known slicks that appear on the surface of the water of the Bay during high energy events such as from storms or boat propellers).

3.1.2 Hydrogeological Characteristics

3.1.2.1 Regional Geology and Hydrogeology

Soils in the Ashland area generally consist of surficial deposits underlain by red clay and silt deposits of the Miller Creek Formation. Thickness of the Miller Creek soils in the Ashland area ranges from approximately 15 to 50 feet based on local well logs. Miller Creek soils are underlain by interbedded glacial clays, sands, and gravels of the Copper Falls Formation. Thickness of the Copper Falls Formation is at least 130 feet based on local well logs. Precambrian aged sandstone of the Oronto Group is likely the uppermost bedrock unit in the Ashland area. Thickness of the sandstone unit has not been determined. The Oronto sandstones are most likely underlain by Precambrian basalt.

A shallow saturated zone is typically found above the contact of the Miller Creek Formation and the overlying surficial soils. Thickness of this shallow zone can locally be up to ten feet, but it is not commonly used as a water supply source. Three aquifers occur in the Lake Superior Basin in the vicinity of Ashland: the Pleistocene sand and gravel aquifer (Copper Falls Formation), the Precambrian sandstone aquifer (Oronto Formation), and the Precambrian basalt aquifer.

The Copper Falls aquifer occurs at approximately 25 to 55 feet below ground surface in the Ashland area. Sandy till units within the aquifer yield low volumes of water (5 to 10 gpm), while sand and gravel lenses can yield up to 100 gpm.

The Copper Falls aquifer is confined by the overlying Miller Creek Formation. The Miller Creek Formation functions as an aquitard – hydraulically sseparating the shallow saturated zones and the Copper Falls aquifer. Wells screened in the Copper Falls aquifer frequently exhibit artesian conditions in the Ashland area, particularly close to the Chequamegon Bay shoreline. Static heads of more than 30 feet above the surface of Lake Superior have been reported at some locations along the Ashland shoreline. Thickness of the Copper Falls aquifer is over 100 feet based on deep piezometer boring information.

The Precambrian basalt aquifer produces moderate to low yields of groundwater. Yields are typically controlle by fracture densities within the bedrock. The basalt aquifer is commonly used as a water supply source south of Ashland whter the aquifer occurs closer to the surface.

3.1.2.2 Site Specific Geology and Hydrogeology

Surficial soils at the Site are underlain by a variety of fill materials, including wood waste (slabs and sawdust), solid waste (including concrete, bricks, bottles, steel, wire, and cinders), and earthen fill (including a buried clay berm along the shoreline on the northeast side of the Site). Fill materials are underlain in places by a 0 to 5.5 foot thick layer of beach sand. Soils of the Miller Creek Formation are present below the fill and beach sand. The Miller Creek soils encountered at the Site consist of clays and silts and range in thickness from 7 to 40 feet. Silty sand and gravel soils of the Copper Falls Formation are present beneath the Miller Creek soils. Thickness of the Copper Falls Formation at the site has not been determined, though monitoring wells installed in December 2003 suggest that the bedrock is at least 192 feet below ground level in at least some locations. Geology of the upper bluff area in the vicinity of the former ravine consists of earthen fill materials, with clay soils of the Miller Creek Formation on the flanks of the former ravine. Miller Creek clay soils are present at the base of the former ravine, however, the thickness of these soils has been measured at as little as four feet at one soil boring location. It is unknown whether the Miller Creek Formation exists along the entire base of the former ravine. Sand and gravel layers interbedded with silty clay lenses were encountered below the Miller Creek Formation.

Offshore geology consists of a discontinuous layer of submerged wood chips on the lake bottom underlain by fine to medium grained sand sediments. The sand sediments are underlain by silts and clays of the Miller Creek Formation. The Copper Falls Formation was not encountered during investigation of offshore sediments.

A shallow saturated zone is present within the soils and fill materials overlying the Miller Creek Formation at the Site. The hydraulic conductivity of the shallow soils and fill materials ranges from approximately 0.1 to 5×10^{-5} cm/sec. The higher hydraulic conductivity values are typically found in locations with saturated wood waste fill. The horizontal hydraulic gradient is very flat (0.001 ft/ft to the north) due to the high hydraulic conductivities on the Site. Artesian conditions are present at the Site in the Copper Falls aquifer. Head levels of approximately 17 feet above ground surface have historically been measured in an artesian well located on the Site.

Hydrogeology of the upper bluff area (the former MGP plant location of the Site) includes low permeability conditions (3×10^{-6} to 4×10^{-8} cm/sec) in the Miller Creek Formation comprising most of the shallow saturated soil in the area. Fill soils located in the former ravine area exhibit hydraulic conductivities approximately 1000 times higher than the surrounding Miller Creek soils. Horizontal hydraulic gradient in the fill soils of the former ravine is approximately 0.09 ft/ft. Direction of the groundwater flow in this location is to the north (toward the mouth of the former ravine). Groundwater used to flow onto the ground surface at the base of the bluff in the proximity of the mouth of the former ravine in the form of a seep. That seep was found to be caused by a 12-inch clay tile pipe. It has since been capped via an interim remedial action. Artesian conditions have not been identified in the Copper Falls aquifer in the vicinity of the former ravine area or the upper bluff area. An upward hydraulic gradient is present in the Copper Falls aquifer in the northern portion of the upper bluff area, and diminishes and eventually changes to a downward gradient as you move south. The general direction of flow in the Copper Falls aquifer is to the north (toward Chequamegon Bay).

(Note: Incorporate a site-wide map, showing how the geology and hydrology of the upper bluff areas relate to the geology and hydrology of the former ravine, and the former lakebed (Kreher Park, the marina, etc. Also include a table with all of the current well and piezometer details – showing where they are screened, depth to water, hydraulic head, etc. An appendix with the boring logs should also be included).

3.1.3 Climate

This section should include information on climate in the Ashland area and how climate may affect contaminant transport as well as the implementation of field work, etc.

3.1.4 Population and Land Use

The population of the City of Ashland is 8,620 based on the 2000 census results. Residents are served by the city's municipal water supply, which is provided from Chequamegon Bay surface water. **(Note: have the City, County, or State records been checked to verify that all residents are hooked up to city water or is it possible that some residents have their own drinking water wells?)** The surface water intake is located approximately 1,900 feet offshore at Longitude 90° 50' 29" E and Latitude 46° 36' 25"N. The intake is located in approximately 23 feet of water and is approximately one mile northeast of the Site. The area is located in the Lake Superior Lowland Physiographic Province characterized by flat to undulating topography underlain by red glacial clay (Miller Creek Formation). Uplands lie to the south of Ashland and are characterized by rolling hilly topography and underlain by sand and gravel soils (Copper Falls Formation). Elevations in the Ashland area range from 601 feet MSL datum (Lake Superior surface elevation) to approximately 700 feet MSL. Regional slope is generally to the north. The Site is comprised of a relatively flat terrace (former lake bed and then landfilled wetlands) and a 30 foot high upper bluff. Elevations of the terrace range from 601 MSL to approximately 610 MSL. The elevation of the upper bluff in the vicinity of the former ravine area is approximately 640 feet MSL.

The Site itself is currently defined as the present extent of contamination: comprised of contaminated sediment (which is believed to be contained primarily within in an inlet of Chequamegon Bay), Xcel's property (a former MGP), and potentially the areas beneath residences, a school, a playground, and a church (the upper bluff) and on the former lake bed area, a former City Waste Water Treatment Plant and buildings, a park with paths, grass, and boat storage. The Site is bordered by a marina, which is also potentially affected by site contaminants. The City of Ashland has a Waterfront redevelopment plan that indicates its preference to expand the marina into the present location of the Site.

(Note: Insert the March 2002 Ashland, Wisconsin Waterfront Development Plan into an appendix of this Work Plan and also discuss the city with respect to the major tourism season and how work at the site, both investigatory and future remedial should be timed and phased to cause the least disruption).

3.1.5 Characteristics of Chemical Contaminants

3.1.5.1 Distribution of Contamination

Briefly describe what we know about contamination based on pre-existing data by media. Use 2 and 3-dimensional maps if possible to illustrate. The contaminant maps in Appendix B are an excellent start at visualizing the contamination.

3.1.5.2 Known and Potential Source Areas of Contamination

Briefly describe the known sources (e.g., the former MGP) and potential sources (landfillig, coal tar dump, etc.). Maps depicting the information should be incorporated into the text. Fingerprint data and analysis previously performed should also be incorporated into the discussion.

3.1.5.3 Chemical Characteristics of Surface Soil

Describe what is known and unknown about surface soil contamination. Use of maps would be extremely useful to provide this information. For example, provide a map that shows previous surface soil sampling locations and a synopsis of the surface soil data. Show the presence/absence of contaminants and where samples have not yet been taken that could be potentially affected.

3.1.5.4 Chemical Characteristics of Subsurface Soil

Describe what is known and unknown about subsurface soil contamination. Provide a map that shows previous subsurface soil sampling locations and a synopsis of the subsurface soil data. Show the presence/absence of contaminants and as with the surface soils, where samples have not yet been taken that could be potentially affected.

3.1.5.5 Chemical Characteristics of Surface Water

Provide a synopsis of any previous surface water sampling data. Published literature on the quality of Lake Superior water, and specifically Chequamegon Bay water can also be used for "background" or reference information. Information from the Ashland Department of Public Works concerning the water quality of Chequamegon Bay water at their inlet would also be helpful.

3.1.5.6 Chemical Characteristics of Sediment
Provide a map showing all previous sediment sampling locations, including background or reference areas. Describe what the current data suggests about sediment contamination here. Describe what is known or not known about sediment transport in this inlet of Chequamegon Bay and any published literature information on sediment transport in this area.

3.1.5.7 Chemical Characteristics of Groundwater (including NAPL and DNAPL)
Describe what is known or not known about contamination in groundwater, from the fill all the way to the Oronto Sandstone. Provide a chart with all information about the piezomenters and wells and whether dissolved phase or nonaqueous phase contaminants have been found in such wells or piezometers. An explicitly clear map or chart that shows where contaminants have been found through time would be extremely helpful.

3.1.5.8 Chemical Characteristics of Air
Describe any previous air sampling events, either outdoor or indoor and what we currently know or don't know. What is the prevailing wind direction? Provide rose diagrams for different seasons, if wind direction and speed are highly variable in the area.

Section 3.2 should be Preliminary Identification of Applicable or Relevant and Appropriate Requirements (ARARs). The following text is recommended:

3.2 Premlinary Identification of Applicable or Relevant and Appropriate Requirements

This section provides a preliminary determination of the regulations that are applicable or relevant and appropriate to the remediation of the site. Both federal and state environmental and public helath requirements are considered. In addition, this section presents an identification of federal and state criteria, advisories, and guidance that could be used for evaluating remedial alternatives.

3.2.1 Definition of Applicable or Relevant and Appropriate Requirements (ARARs):

The legal requirements that are relevant to the remediation of the site are identified and discussed using the framework and terminology of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). These acts specify that Superfund remedial actions must comply with the requirements and standards of both federal and state laws.

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. An applicable requirement must directly and fully address the situation at the site.

Relevant and appropriate requirements are those cleanup standards, standards of control, or other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Actions must comply with state ARARs that are more stringent than federal ARARs. State ARARs are also used in the absence of a federal ARAR, or where a state ARAR is broader in scope than the federal ARAR. In order to qualify as an ARAR, state requirements must be promulgated and identified in a timely manner. Furthermore, for a state requirement to be a potential ARAR it must be applicable to all remedial situations described in the requirement, not just CERCLA sites.

ARARs are not currently available for every chemical, location, or action that may be encountered. When ARARs are not available, remediation goals may be based upon other federal or state criteria, advisories, and guidance, or local ordinances. In the development of remedial action alternatives,the information derived from these sources is termed "To Be Considered" and the resulting requirements are referred to as TBCs. Clean-up goals can be based upon non-promulgated criteria and advisories such as reference doses when ARARs do not exist, or when an ARAR alone would not be sufficiently protective in the given circumstance.

By contrast, there are six conditions under which compliance with ARARs may be waived. Remedial actions perfumed under Superfund authority must comply with ARAR sexcept in the following circumstances: (1) the remedial action is an interim measure or a portion of the total remedy which will attain the standard upon completion; (2) compliance with the requirement could result in greater risk to human health and the environment than alternative options; (3) compliance is technically impractical from an engineering perspective; (4) the remedial action will attain an equivalent standard of performance; (5) the requirement has been promulgated by the state, but has not been consistently applied in similar circumstances; or (6) the remedial action would disrupt fund balancing.

Potential ARARs and TBCs are classified as chemical-, action-, or location-specific. Chemical-specific ARARs or TBCs are usually health or risk-based numerical values, or methodologies which when applied to site specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Location-specific ARARs or TBCs generally are restrictions imposed when remedial activities are performed in an environmentally sensitive area or special location. Some examples of special locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs or TBCs are restrictions placed on particular treatment or disposal technologies. Examples of action-specific ARARs are effluent discharge limits and hazardous waste manifest requirements.

3.2.2 Consideration of ARARs during the RI/FS:

ARARs are used to determine the necessary extent of cleanup, to scope and formulate remedial action alternatives, and to govern the implementation of the selected alternative. A preliminary list of ARARs is developed as part of the work plan development.

As the RI/FS process continues, the list of ARARs will be updated, particularly as guidances are issued by state and federal agencies. ARARs will be used as a guide to establish the appropriate extent of site cleanup; to aid in scoping, formulating, and selecting proposed treatment technologies; and to govern the implementation and operation of the selected remedial alternative. Primary consideration should be given to remedial alternatives that attain or exceed the requirements of the identified ARARs. Throughout the RI/FS, ARARs are identified and utilized by taking into account the following:

- Contaminants suspected or identified to be at the site;
- Chemical analysis performed, or scheduled to be performed;
- Types of media (air, soil, ground water, surface water, and sediment);
- Geology and other site characteristics;
- Use of site resources and media;
- Potential contaminant transport mechanisms;
- Purpose and application of potential ARARs; and
- Remedial alternatives considered for site cleanup.

3.2.3 Preliminary Identifcation of ARARs and TBCs

The National Contingency Plan and the SARA/CERCLA Compliance Policy guidance define applicable requirements as the federal and state requirements for hazardous substances, which would be legally binding at the site, if site response were to be undertaken regardless of CERCLA Sections 104 or 106. Relevant and appropriate requirements are defined as those federal and state requirements that, while not directly applicable, apply to facilities or problems similar to those encountered at this site. With respect to the selection of remedial alternatives, relevant and appropriate requirements are to be afforded the same weight and consideration as applicable requirements.

The following federal requirements are potentially applicable or relevant and appropriate to the site:

Chemical-Specific ARARs

Resource Conservation and Recovery Act Ground Water Protection Standards and Maximum

Concentration Limits (40 CFR 264, Subpart F)
Standards and Maximum Concentration Limits (40 CFR 264, Subpart F)
Clean Water Act, Water Quality Criteria (Section 304)
National Ambient Air Quality Standards (40 CFR 50)
Safe Drinking Water Act, Maximum Contaminant Levels (40 CFR 261)
Toxic Substances Control Act

Location-Specific ARARs

Endangered Species Act of 1973 (16 USC 1531)
Executive Order on Wetlands Protection No. 11990
National Historic Preservation Act (16 USC 470) Section 106 (36 CFR 800)
RCRA Location Requirements for 100-year Floodplains (40 CFR 264.18(b))
Fish and Wildlife Coordination Act (16 USC 661)
Clean Water Act Section 404 and Rivers and Harbor Act Section 10 Requirements for Dredge and Fill Activities (40 CFR 230)
Army Corps of Engineers Regulations for Construction and Discharge of Dredged or Fill Materials in Navigable Waterways (33 CFR 320-330)
Wetlands Construction and Management Procedures (40 CFR 6, Appendix A)

Action-Specific ARARs

RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal Systems (i.e., landfill, incinerators, tanks, containers, etc.) (40 CFR 264 and 265) (Minimum Technology Requirements)
RCRA Subtitle C Closure and Post-Closure Standards (40 CFR 264, Subpart G)
RCRA Ground Water Monitoring and Protection Standards (40 CFR 264, Subpart F)
RCRA Manifesting, Transport and Recordkeeping Requirements (40 CFR 262)
RCRA Manifesting, Transport, and Recordkeeping Requirements (40 CFR 262)
RCRA Wastewater Treatment System Standards (40 CFR 264, Subpart X)
RCRA Corrective Action (40 CFR 264.101)
RCRA Storage Requirements (40 CFR 264; 40 CFR 265, Subparts I and J)
RCRA Subtitle D Nonhazardous Waste Management Standards (40 CFR 257)
Off-site Transport of Hazardous Waste (EPA OSER Directive 9834.11)
Reinjection Requirements (EPA OSWER Directive 9234.1-06)
RCRA Excavation and Fugitive Dust Requirements (40 CFR 264.251 and 264.254)
Safe Drinking Water Act, Underground Injection Control Requirements (40 CFR 144 and 146)
RCRA Land Disposal Restrictions (40 CFR 268) (On- and off-site disposal of excavated soil)
Clean Water Act – NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)
Effluent Guidelines for Organic Chemicals, Plastics, and Rsins (Discharge limits (40 CFR 414)
Clean Water Act Discharge to Publicly Owned Treatment Works (POTW) (40 CFR 403)
Nation Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 61)

DOT Rules for Hazardous Materials Transport (49 CFR 107, 1071.1 – 171.500)
Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904, 1910, 1926)
Fish and Wildlife Coordination Act (16 USC 661)

When ARARs do not exist for a particular chemical or remedial activity, other criteria, advisorires and guidance (TBCs) may be useful in designing and selecting a remedial alternative. The following criteria, advisories and guidance were developed by EPA, other federal agencies and state agencies.

Federal TBCs (Action- , Location-, and Chemical-Specific):

Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs)
Maximum Contaminant Level Goals (56 CFR 3256, January 30, 1991, 50 FR 46936-47022, November 13, 1985)
Proposed Federal Air Emission Standards for Volatile Organic Control Dquipment (52 FR 3748) (air stripper controls)
Proposed Requirements for Hybrid Closures (combined waste-in-place and clean closures) (52 FR 8711)
USEPA Drinking Water Health Advisories
USEPA Health Effects Assessment (HEAs)
TSCA Health Data
Toxicological Profiles, Agency for Toxic Substances and Deisease Registry, U.S. Public Health Service
Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 FR 8711)
Cancer Assessment Group (National Acadamy of Science) Guidance
Ground Water Classification Guidelines
Ground Water Protection Strategy
Waste Load Allocation Procedures
Fish and Wildlife Coordination Act Advisories
Federal Guidelines for Specification of Disposal Site for Dredged or Fill Material
Proposed RCRA Corrective Action Regulations (July 27, 1991)
NOAA's Effect Range-Low (ER-L) and Effects Range – Medium (ER-M) Requirements
Ontario Ministry of the Environment and Energy Lowest Effect Level (LEL) and Severe Effects Level (SEL)
USEPA Region 9 Risk Based Concentrations (RBCs)

Please note that WDNR will provide EPA and the Respondent with its specific State ARARs for this site.

The next section in the Work Plan should be **3.3, Preliminary Human Health Risk**

Assessment. This would replace the current section 3.2, Potential Contaminant Exposure Pathways.

A Baseline Human Health Risk Assessment was prepared for WDNR by SEH, dated June 1998. It will require an update, based on additional data to be collected as part of this Work Plan. Therefore, the draft work plan, Section 3.2 shall be replaced by this new section 3.3, Preliminary Human Health Risk Assessment, which shall be a synopsis of the June 1998 SEH report following this format (and some suggested language as follows):

3.3 Preliminary Human Health Risk Assessment

The Preliminary Human Health Risk Assessment for the Ashland/NSP Lakefront Superfund Site, presented below, is based on available soil, groundwater, surface water and sediment analytical results, site visits, and historical site information, including the Health Consultation Reports by ATSDR/Wisconsin Department of Health and the WDNR/SEH Baseline Human Health Risk Assessment, June 1998.

Potential chemicals of concern, source areas and release mechanisms, exposure pathways and receptors, and additional data needs are discussed in the following subsections.

3.3.1 Potential Chemicals of Concern

A list of potential chemicals of concern has been developed based on available analytical data from previous surface soil, groundwater, surface water, and sediment sampling at the Upper Bluff Ravine Area / former MGP facility, Kreher Park, and the inlet to Chequamegon Bay. This list is preliminary and may be adjusted if the additional sampling conducted pursuant to this Work Plan indicates any other significant chemicals specific to the Site. The primary considerations for selection of chemicals of concern include:

- Frequency of detection in analyzed medium;
- Historical site information/activities (i.e., site-relatedness);
- Chemical concentration (toxicity screen);
- Chemical toxicity (potential carcinogenic and noncarcinogenic effects, weight of evidence for potential carcinogenicity);
- Chemical properties (mobility, persistence, and bioaccumulation);
- Significant exposure routes.

That is, COCs are a subset of the total list of contaminants detected and represent those contaminants likely to contribute most to the overall human health risk at the site. For each medium, all detected contaminants are first grouped by chemical class to ensure that contaminants from each calss are represented as COCs. The COCs are then selected based on the following criteria: contamianat concentration, toxicity, and frequency of detection.

Potential COCs for the site include, but are not limited to:

PAHs: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)Anthracene, Benzo(a)Pyrene, Benzo(b)Fluoranthene, Benzo(k)Fluoranthene, Benzo(ghi)Perylene, bis(2-ethylhexyl)phthlatate, Chrysene, dibenzo(ah)Anthracene, Dibenzofuran, 2,4-Dimethylphenol, fluoranthene, fluorene, Indeno(123-cd)Pyrene, 1-Methyl Naphthalene, 2-Methyl Naphthalene, Naphthalene, Phenanthrene, Phenol, Pyrene, 2,6-Dinitrotoluene, Carbazole.

The carcinogenic PAHs are: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracne, Indeno(1,2,3-cd)pyrene.

The noncarcinogenic PAHs are: Acenaphthene, Acenaphthylene, Anthracene, Fluoranthene, Fluorene, 2-Methylnapthalene, Napthalene, Phenanthene, Pyrene.

The VOCs include: Benzene, n-Butylbenzene, sec-Butylbenzene, tert-Butylbenzene, Ethylbenzene, isopropylbenzene, p-Isopropylbenzene, p-Isopropyltoluene, Naphthalene, n-Propylbenzene, Toluene, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, Trichlorofluoromethane, Total Xylenes.

The inorganics include: Arsenic, Copper, Lead, Zinc, Cyanide, Selenium, Chromium, Aluminum.

In addition, this section should also include the following tables:

1. A table showing maximum PAH concentrations in surface and subsurface soils showing the specific parameter, the concentration, and the depth/location; and
2. A table showing maximum PAH concentrations in sediment showing the specific parameter, the concentration, and the depth/location.

The COCs should then be divided into media: surface water, groundwater, surface soil, subsurface soil, and sediments.

3.3.2 Potential Source Areas and Release Mechanisms

Note: This section can include a synopsis from Sections 4.0 through 9.6 of the 1998 Human Health Risk Assessment Report.

Other suggested language is as follows:

The Ashland/NSP Lakefront Site includes the following source areas: the former MGP property, the former clay tile pipe (seep) from the MGP property, the existing coal tar within the MGP property and the subsurface soil and groundwater contaminated by that coal tar spreading beneath the subsurface, subsurface contamination within the Kreher Park area (which was contaminated by the coal tar from the aforementioned source areas and potentially other contaminant sources from historical dumping and activities on that property over the past hundred years), and the contaminated sediment in the Chequamegon Bay inlet. The contaminated sediment is a secondary source area. The origin of that contamination is the coal tar which has migrated into the bay from the former MGP property via the seep, previously existing discharge pipes, subsurface migration via groundwater, and possibly stormwater discharge into the bay. It is also possible that some contaminated sediment is derived from migration of other contaminants from the historical landfilling and dumping in the area now known as Kreher Park.

Release mechanisms from original sources of contamination include migration with the flow of groundwater, preferential flow of surface water through conduits such as the former 12-inch clay tile pipe and open sewer and preferential flow of groundwater and contaminants through the non-homogeneous fill materials. Bioconcentration of chemicals in fish tissue may occur through contact with impacted surface water (lake) water and sediments.

Media receiving the COCs include groundwater, surface water, subsurface soils, surface soils, and sediment and the source, release and transport mechanisms, and receiving media are summarized as follows:

Release Source	Release/Transport Mechanism	Receiving Media
Contaminated Soils	Leaching Surface Runoff Volatilization/fugitive dust generation Contact/uptake	Surface and subsurface soils Sediments/surface water Air Biota
Contaminated Groundwater	Migration & discharge to surface water Volatilization Contact/uptake	Surface water / sediments/ surface soils / biota Air Biota
Contaminated Surface Water and Contaminated Sediment	Volatilization Partitioning Contact/uptake	Air Surface water Biota

Currently, the former MGP property is privately owned by Xcel Energy and it is gated and locked. Only Xcel Energy employees and contract staff involved in operations and maintenance of the interim remedial action may be exposed to the contaminated groundwater, coal tar, and impacts from volatilization through the air. The former seep area has been capped and is fenced off to prevent exposure to this area. Kreher Park is accessible and has significant use by adults and children for recreational purposes. However, the soil is covered by grass and shouldn't be a direct contact threat if it contains contamination. Verification sampling will be performed as part of this work. Two artesian wells are used at Kreher Park. Contamination has not yet reached these wells, based upon some quarterly sampling events, but, it may only be a matter of time as the latest sampling of newly installed wells to the top of bedrock show DNAPL has traveled into the Copper Falls Formation.

Note: Incorporate a table showing the monitoring results for the artesian wells (all data that is available, showing the dates of sampling, the parameters sampled for, the methodology, and the method detection limits).

The contaminated sediment and wood chips appear generally to remain within the inlet, based upon previous data collected. However, additional data is needed to verify this hypothesis. Certainly, more recent data indicate the presence of contaminants within areas previously noted as "background" and while visual observation may indicate that the bulk of contaminants are within the inlet, visual observation cannot be used to ascertain the extent of contamination. There may be a dissolved phase slowly migrating into the surface water column and moving out into the bay. A major storm event could cause significant erosion and migration of the contaminated sediment. Signs are posted along the lakefront to warn adults and children and to prohibit access to this area of the lakefront. However, it is only signage and is easily accessible to a trespasser. Boat traffic, propellers, and wave action will cause oil slicks to form and volatilization into the air. Buoys and signs can be easily removed and some boaters choose to ignore the buoys and signs.

The Chequamegon Hotel, residences, and other properties such as the marina and R/V park are in very close vicinity to the Site. The lakeshore within the Site boundary includes a path for recreational use (e.g., walking, jogging).

The pathways of contamination are summarized as follows:

<u>3.3.2.1 Surface Soil Pathway</u> The surface soil sampling completed during previous studies was limited and does not provide adequate information to assess risk to human health or the environment in the following areas: the former MGP property, non-paved locations, within Kreher Park (especially in areas believed to include a former solid waste fill area, a historic coal tar dump, and locations that may possibly have been impacted by the former seep), and in areas throughout Kreher Park, the residential area, the marina and RV park that is not suspected to be contaminated based on historic maps, but, that could be potentially contaminated since much of that land was filled in and potentially subject to the disposal of various waste products.

<u>3.3.2.2 Subsurface Soil Pathway</u> The subsurface soil sampling completed during previous studies was also limited in the same way as the surface soil sampling previously completed. The same locations will be sampled as the surface soil locations to determine the presence or absence of contamination throughout the Site's subsurface.

<u>3.3.2.3 Groundwater Pathway</u> Previous groundwater investigations were focused on the MGP

area in the fill and shallow zone (above the Miller Creek Formation), and did not include an investigation to determine the extent of contamination emanating from the former MGP area and its spread down into the ravine, and the former lakebed fill area (Kreher Park).

3.3.2.4 Surface Water / Sediment Pathway Previous investigations were thorough regarding the characterization of sediment in one specific inlet in Chequamegon Bay. However, limited sampling was conducted outside of the inlet and additional information is needed to assess the potential for the spread of contaminants outside of the inlet through natural processes, or to explain the current hypothesis that the contamination may be resuspended and eroded from the surface within the inlet, but does not spread much, outside, of the inlet. However, chemical analysis outside the inlet does indicate the presence of contaminants and the extent needs to be investigated. Surface water sampling was limited in previous investigations and additional data is needed.

3.3.3 Summary of Additional Data Needs As specified above, surface and subsurface soil samples are needed to fill in data gaps regarding the presence or absence of contaminants in unpaved areas on the former MGP property and its surrounding areas, within Kreher Park (the filled-in lakebed) and around the residential areas that may have been impacted by site contamination. Additional sediment sampling is necessary to address contaminant migration, transport, and/or contaminant stability within the inlet. Sampling of benthic organisims within the inlet and in reference areas are necessary to quantify the ecologic risk. Some additional fish tissue sampling is also necessary to address human health risk from any fish that may be affected by contaminated sediment/surface water.

Section 3.2.2 Ecological Exposure Pathways, Page 3-5 This should now be revised to Section 3.4 and should also include a reference to the Ecological Risk Assessment Report (SEH, 1998) and the Supplemental Ecological Risk Assessment Report (SEH, 2002). Please note that the procedure outlined in the SEH version of the work plan was previously reviewed by EPA and deemed to be adequate and reflective of previous meetings between EPA, WDNR, and Xcel. The assessment endpoints, measurement endpoints and other key parts of the ecological risk assessment in the SEH version represent the technical requirements previously recommended by EPA to WDNR.

In the second paragraph, please also note that aquatic plants can absorb and adsorb chemicals from sediment and surface water. In addition, delete "although this is primarily a concern for those chemicals that are bioaccumulative" and replace with: "This is a concern for chemicals that are bioaccumulative and those that can form other potentially toxic forms via degradation."

In the fourth paragraph, please add the language noted in **bold**:

Fish may be exposed to chemicals in sediment and surface water through ingestion, dermal contact, uptake through gills, and by feeding on aquatic plants, invertebrates, or smaller fish. Exposure may occur during **most activities including** feeding, spawning, or burrowing. **Eggs**

and embryos may come into contact with contaminated substrates and water. If any contaminants are bioaccumulative, a potential exposure pathway **may be trophic transfer to birds, mammals, and fish.**

The fifth paragraph should be revised to:

Birds and mammals may be exposed directly to chemicals in the sediment and surface water through incidental ingestion, dermal contact, and inhalation.

Also, delete references to "Area of Concern" and simply state that this ecological exposure discussion is in regards to contaminated surface water and sediment.

Section 3.3 and 3.4, pages 3-6 through 3-8:

The information in these sections should be merged into the new sections 3.3. and 3.4. Please note the following revisions to the text, however:

Delete references to "areas of concern."

Note changes in **bold**:

The areas of known contamination in near shore sediments are located within the inlets created by the jetty and marina extension offshore from Kreher Park. The contaminants in these sediments originate from a number of historical operations including:

1) The former MGP;
2) Uncontrolled placement of wood wastes, soil, sand, and demolition waste material at Kreher Park;
3) Sawdust and wood waste from a series of sawmills that operated on the Ashland site from the early 1880s until about the mid-1930s were dispersed by natural forces, rain, flooding, storms and ice throughout Chequamegon Bay;
4) Log rafting and timber loading led to bark and wood waste accumulating to depths of many feet in various places in Chequamegon Bay;
5) **Potential r**eleases from wood treatment operations **which may have occurred**; and
6) **Past d**ischarges from the Ashland WWTP .

Issues of environmental concern associated with the presence of contaminants in the sediments include:

- The potential availability of contaminants in sediments at concentrations that potentially cause direct **and indirect** adverse effects to aquatic and semi-aquatic organisms **as well as aquatic - dependent wildlife and birds**; and

- Contaminants in sediments **potentially bioaccumulating** in the food chain which can produce adverse effects in higher trophic level biota.

This RI work plan describes studies that will be conducted to acquire data, which, in conjunction with previously collected data, can be used to evaluate whether the biological components in this near shore aquatic ecosystem are at risk of adverse effects from contaminants associated with these sediments **and surface water**. The biological components of this ecosystem that will be evaluated include benthic macroinvertebrates, finfish and wildlife.

<u>Section 3.5 Preliminary Identification of Response Objectives and Remedial Action Alternatives, Page 3-8:</u> The footnote should include a comment that EPA considers the whole site as one operable unit and if deemed necessary, the site can be divided into discrete actions at a later date. Also, please clarify that the remedial action alternatives examined previously are preliminary and will be reevaluated. The text should stress that the lists of alternatives presented in this section, and the recommended remedial action alternatives will be further evaluated during the Feasibility Study and will not be limited to the options shown. This would be a general disclaimer ensuring that the reader would not bet the wrong impression and consider the recommended remedial alternatives presented in this section as the final remedies.

<u>Section 4.0 Work Plan Rationale, Page 4-1</u>: Delete these 3 paragraphs and replace with:

As previously described, both WDNR and Xcel Energy have performed investigatory work concerning soil, sediment, and ground water contamination. The original work was performed before there was an understanding of the potential source areas and contaminant history of the various properties. Today, we understand that there is coal tar beneath the former MGP, that there are potential areas of contaminated fill and wood waste between the MGP and the lake, also potentially contributing to the problem, and it is necessary to fully define the extent of subsurface contamination and understand how the contamination enters the lake (e.g., subsurface transport, surface transport) and may or may not migrate into the sediments, surface water, biota, and air. The Contaminated Sediments Technical Advisory Group (CSTAG) outlined the following data needs:

1. Fully characterize the free product and the dissolved phase in the deeper aquifer;

2. Update the risk assessments with current EPA guidance and site-specific data (e.g., consumption rates, especially with respect to subsistence fisherman from the Tribe, and frequency of dermal contact);

3. Evaluate sediment stability (sediment transport mechanisms) using core data and depositional pattern data as well as the effect of ice scour and future uses of the location (e.g., marina);

4. Validate bioaccumulation data and use existing fish tissue data where possible;

5. Consider installation of a tempory breakwall;

6. Consider performing a sensitivity analysis to compare a range of cleanup numbers and technologies;

7. Develop site-specific Remedial Action Objectives and clearly articultate RAOs for protecting benthos, fish, and recreational users;

8. Collect site-specific information to document the effectiveness of any institutional controls.

<u>Section 4.1.2 Site Data Quality Objectives, page 4-3:</u>

It would be preferable to revise this section to reflect the seven step process and clearly delineate:

The Problem (e.g., there is coal tar contamination beneath the MGP, there is related ground water contamination, there is related sediment contamination --- but previous studies did not answer basic questions such as the relationship between the MGP contamination and the sediment contamination, is contamination continuing to migrate into the Bay via ground water and/or surface water transport, is sediment contamination being transported out of the inlet (via transfer into surface water, migration of contaminated sediment and wood waste, into biota, or volatilizing), quantification of risks to the ecosystem, quantification of risks to subsistence anglers, existence of surface and subsurface soil contamination in the entire study area, the potential for volatilization of contaminants into nearby residences and businesses, the potential for the public artesian wells to be affected by contaminants, the presence of other wastes from other sources (the landfilled areas between the present shoreline and the upper bluff properties);

The Decisions to be made (quantifying risk based on updated data, ascertaining the extent of the contamination in the soil, groundwater, sediment, and surface water, understanding how contamination made its way into the Bay and whether or not it is continuing to flow into the Bay, understanding contaminant transport, erosion, and deposition, etc.);

Identifying inputs to the decision (clearly specify the data that needs to be collected, the required detection limits based on the potential clean up numbers, etc.);

Define the boundaries of the study (MGP plant, extent of contaminated groundwater horizontally and vertically, extent of contamination on surrounding properties and in Chequamegon Bay);

Develop decision rule (clearly define the potential action levels, e.g., the Wisonsin standards, and risk based numbers)

Specify tolerable limits on decision errors (clearly define these)

Optimize the design for obtaining data (e.g., are there innovative proven technologies used at other MGP sites that were effective at tracking DNAPL plumes that served to save time and expenses and met detection level needs?) -- discuss specifics.

It would also be preferable to replace the bullets with:

1.An inlet of Chequamegon Bay is known to be contaminated with polyaromatic hydrocarbons (PAHs). The sediments are contaminated with coal tar and its constituents, wood waste, and possibly other constituents derived from surface water runoff, and migration of contaminated groundwater through landfill material into the Bay. Slicks appear on the water surface when the sediments are agitated. It is believed that sediment contamination is predominantly confined to the one inlet, but contaminant migration and sediment transport (and sediment stability, depositional and erosional patterns) have not yet been defined. A limited number of sampling locations outside the boundary of the inlet indicate the presence of similar contaminants at lower levels, which may be indicative of transport of contaminants out of the inlet over time, or, the potential for contaminants to be migrating into the bay in these other locations via other ground water or surface flow pathways.

2. A former Manufactured Gas Plant, located on a bluff near this inlet, is underlain by PAHs, specifically, coal tar. An interim remedial action comprised of extraction wells, oil/water separator, air stripper, and carbon filtration treatment system is currently on-going. Free-phase and dissolved phase coal tar constituents and volatile organic compounds are being extracted from the Copper Falls Aquifer. The horizontal and vertical extent of this groundwater contamination has not been defined, to date. Immediately surrounding this property are residences, a church, and a school. The extent of coal tar migration has not been fully defined. Evidence thus far indicates that the coal tar may have been transported directly through a former tile pipe (the seep that has since been closed off), through surface water runoff, and possibly via ground water migration into the lake. It is not known whether or not contamination continues to flow into the lake or if flow has stabilized.

3. As previously stated, the contaminants within Chequamegon Bay may have been deposited through surface water runoff, a direct discharge pipe, a seep, or via groundwater migration and infiltration and/or a combination of all of these. The source area is likely to be the former MGP, but may also include other contaminant source areas attributable to other activity on the adjacent properties.

4. The area between the current shoreline and higher ground (a bluff) is a stretch of land that is now vegetated and contains recreational park area. This area was once wetland but was filled in during the late 1800s and early 1900s with debris and general waste. The newly created land was used by various saw mills and lumber companies. This land, itself, may also serve as a source of contamination to groundwater and Chequamegon Bay. It is also possible that coal tar from the MGP was deposited within this land area. Some coal tar may have migrated to this location via a seep that was recently capped. Contamination within this area has not been defined by previous studies.

5. Coal tar and its constituents are known to be a direct contact threat to human beings (see baseline human health risk assessment dated June 1998 and ATSDR report dated September

2003). The known area of contaminated sediments has been temporarily addressed by warning signs and "institutional controls" on the area --- boats are prohibited from entering the area. However, it is a passive system and relies on local police enforcement. A seep area was also addressed --- it was capped to prevent coal tar from moving through an old 12" clay tile pipe.

6. Two drinking water "artesian wells" are located close to known areas of contamination: one is just below the former MGP property, near the entrance to Kreher Park and the other is next to the contaminated inlet, on the marina property. These wells have been sampled on a quarterly basis and have not yet shown any contamination. The well construction records for these wells have not yet been located. It is believed that they draw water from the Copper Falls Formation. Coal tar includes a dense phase that may indeed have found its way down into the Copper Falls Formation. These wells may never be in the pathway of contaminant migration or may be in the pathway and have simply not been affected yet because of their depth and distance from the original source area. Since these wells are used by the public for drinking water, the future use of these wells must be addressed. The City of Ashland has a public water supply system derived from Chequamegon Bay. (Are all residences and businesses using this system? Are there any residences in proximity to the Site that use their own private well?)

7. Surface soil and subsurface soil contamination and groundwater contamination has not been delineated and contaminant migration pathways need to be defined in order to fully assess risks.

8. A human health and ecological risk assessment has been completed by WDNR using the current data set. Additional data will be collected as part of this study and the human health and ecological risk assessment will be updated to reflect the additional data and quantify the risks.

9. Based on the updated risk assessment and understanding of contaminant flow and migration, then potential remedial alternatives can be assessed.

10. Laboratory data must be generated with detection limits appropriate to potential media specific cleanup standards, specifically:

Wisconsin groundwater quality standards (Preventative Action Limits and Enforcement Standards per Wisconsin Administrative Code NR 140);

Wisconsin Water Cleanup Standards;

Wisconsin Soil Cleanup Standards (Residual Soil Contaminant Levels and Soil Screening Levels per Wisconsin Administrative Codes NR 720 and 746, respectively);

Wisconsin Sediment Cleanup Standards.

Section 4.2, Work Plan Approach, page, 4-4: Delete the text concerning the "two approaches for evaluating the contaminated sediments." This Work Plan only need provide the recipe for collecting the data needed to address the data gaps identified. The stakeholder involvement is already built into the Superfund process and is already being followed. The Bad River Band of the Chippewa Nation and the Red Cliff Band of the Chippewa Nation have been provided the opportunity to comment on this Work Plan, as have the State of Wisconsin, and the Trustees, through NOAA. Once the technical document is deemed acceptable by US EPA, it will be made available to the public. The detailed technical decisions regarding sampling strategies, risk assessment techniques, etc. are the responsibility of the Agencies mentioned above. Once the details are worked out, other comments and information offered by the public can be incorporated into the program by EPA.

Recommend text is:

This investigation builds upon previous work. The remedial action objectives for the Site include completing the contamination source identification, updating the human health and ecological risk assessments, determining the full extent of contaminant migration from the source areas, determining the mechanisms for contamination reaching the inlet and whether or not contaminants continue to migrate into the Bay, ascertaining the depositional and erosional potential of the contaminated sediments (sediment stability and transport), flux of contaminants from the sediment into the water column and biota, groundwater contaminant flow and potential to impact public wells or any private residential wells, extent of surficial and subsurface soil contamination and any potential for volatilization of contaminants into breathing zones.

The objectives to be achieved during this RI/FS are:

Define the nature and extent of contamination at the Site within the following media: surface soil; subsurface soil; surface water; sediment; and groundwater. Pre-existing data and newly collected data will be utilized.

Identify and quantify potential human health and ecological risks posed by the Site by updating, with the newly collected data, the baseline human health and ecological risk assessments.

Develop and screen remedial alternatives, building upon information in the December 1998 Remediation Action options Feasibility Study (WDNR, December 1998).

Conduct detailed analysis of appropriate remedial alternatives.

Include a detailed table in this section which summarizes the actual data requirements for the risk assessment update and the alternatives evaluation.

Sections 4.2.1 through 4.2.3.5, pages 4-4 through 4-59: Delete these sections as they need to be greatly reworked. Much of the information and detail in these sections needs to be completely revised (no references to Areas of Concerns, no discussion of alternate approaches and policy discussions) and much of the technical detail is actually more appropriately placed within Section 5 of the Work Plan. These sections add to confusion and repetitiveness. Much of the information regarding the Settling Defendant's beliefs for the study would be more appropriate in a policy letter to the Agency than in a Work Plan. It was our understanding from the scoping meeting in January that Xcel would provide its alternative strategy in a separate letter, rather than within the Work Plan submission. However, neither EPA nor Xcel clearly specified the format to be used at the meeting and thus, the misunderstanding. We would prefer that the work plan text simply provide the facts as we know them to date (from previous work), outline what we know and don't know (the "conceptual site model), and provide the details for the work to be performed.

As previously stated, the work plan is our "cook book" for conducting the RI/FS. All of this extraneous information creates a very confusing, complicated, and arduous document. The sampling details shall be merged into Section 5. EPA is including the following comments, in addition to those provided above, on the subsections of Section 4, in order to assist Xcel Energy with its revisions. As sections 2 and 3 could be merged, we'd highly recommended merging the information in sections 4 and 5 to create a more clear and precise document.

Section 4.2.1.1, Page 4-5: The purpose of the sampling program proposed in the Upper Bluff/Filled Ravine is to further characterize the lateral and vertical extent of contamination. A step-out boring approach or dynamic triad sampling program, with a field laboratory, is recommended for this characterization. Borings can be offset when contamination is discovered through field screening and samples could be collected, sent to the laboratory, and "held" for later analysis, or quick turnaround method laboratory analyses can be used. This approach could minimize future field efforts to complete the characterization of the lateral and vertical extent of contamination. Also, a map showing the individual gas holders and tank locations should be incorporated.

With regards to the air emission investigation, the EPA draft guidance entitled *Evaluating The Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils* is limited for this site because it was developed to address the empirical limitions found in the Johnson and Ettinger studies, particularly with regard to and in order to address chlorinated solvents. Chorlinated solvents have physical, chemical and vapor migration characteristics much different than petroleum and coal-tar related solvents. These issues will be taken into account with all components of this air investigation to the inhalation pathway.

Section 4.2.1.1, Page 4-6: A clarification should be included in the text regarding the second paragraph. The surface and subsurface soil sampling was given conditional approval back in September 2003 as part of a conditional approval to get work started last fall. That is EPA, in consultation with WDNR, granted conditional approval of the Quality Assurance Project Plan, dated August 22, 2003, provided that the Quality Management Plan for URS be submitted shortly thereafter (which it was). The approval was only for the subset of RI/FS tasks to be performed in the fall of 2003 and was specific to installation of certain wells, specific groundwater sampling, and geoprobe soil sampling and laboratory analysis. It was given to help expedite work that all parties are in agreement on. EPA reserved its rights, in that approval memorandum/email, to require installation of additional wells and additional soil sampling.

Section 4.2.1.2, Page 4-6: Delete the term "feature" in the first sentence. After the discussion on the piezometers and their installation depths, include an explanation as to how the screen depths were selected for these locations.

The number of existing and proposed wells does not seem adequate to determine the horizontal extent of the free-product plume. It is stated in this section that the product may be near or infiltrate MW-15B and MW-21B, however, the investigation is planned to identify the source for the contamination. The boring planned in the area of MW-15B are drilled to a maximum depth of 20 feet. The product is expected to be at a greater depth. It is recommended to conduct a comprehensive investigation to identify the source of contamination in MW-15B and MW-21B.

It is also stated that total petroleum constituents (33 ug/L) were measured in the sample of MW-2C, installed intersecting the upper bedrock at nearly 200 feet. Based on this, the contamination has **already migrated into the bedrock**. Further delineation for contamination migration in this area is required.

The purpose/rationale for the additional piezometers is not documented in the work plan. The need is also not specified in the Field Sampling Plan. In addition, the rationale for the varying depths is also unclear in the FSP. Clear Data Quality Objectives must be spelled out in the work plan.

Instead of pinpointing locations for additional wells and piezometers, field-based methods should be utilized to track the contamination and DNAPL. Field-based methods are easily available at relatively low costs.

Section 4.2.1.2, Page 4-6: The discussion of the interim tar removal system states that the low flow system is being used because of the large volume of tar estimated within the free product plume. It was our understanding that the low flow system was being used because of the limitations on the volume of water that can be discharged to the city's waste water treatment plant. In the last sentence, replace the term "better," that is: "The proposed sampling program is intended to define the extent of the free-product plume, as well as provide information on the extent of the dissolved phase plume."

Section 4.2.1.2, Page 4-7, Second Paragraph: Revise the second paragraph as follows:

Samples of free-product and soil will be collected to evaluate the physical properties of the product interacting with the soil matrix. This will provide data on the disposition of the free-product. Interface tension and residual saturation tests will be conducted on samples to evaluate its state, whether the plume is static or migrating, as well as allow a prediction on further future recovery.

Section 4.2.1.2, Page 4-7, Third Paragraph:

The third paragraph begins by stating that groundwater modeling will not be performed, which appears acceptable so long as the extent of contamination is thoroughly defined through investigation. The text states that samples of the aquifer material will be collected and analyzed for total organic carbon (TOC). This does not appear to be consistent with the rest of the work plan or the field sampling plan. As was noted at the Technical Scoping Meeting, if TOC samples are ever to be collected (**it is EPA's position that they should be**), they should be collected during this phase of the investigation because it could take substantial effort and cost to re-advance soil borings after they have been abandoned.

In addition, no forensics analysis is proposed for any NAPL samples (if encountered). The WDNR Work Plan (SEH) proposed forensics analysis on NAPL samples (if encountered) and on 10% of all SVOC samples within the upper bluff/filled ravine. This was pointed out in the Technical Letter Report (Newfields, December 2003). Xcel Energy reiterated that no forensics analysis will be completed except for the sediments. A clarification is required here. Why is no forensics proposed for anything but the sediments? What would the forensics analysis in the sediments be compared to? EPA's position is that forensics analysis should be performed on both sediment and other media, in order to help determine the original source areas. Forensics in all media can help define other sources, besides the MGP, for the contamination. In areas where it is a clear-cut case that the MGP is the source, we agree that no forensics are necessary. In areas where there was landfilling, forensics could be extremely helpful. Our intention is not just to tie contaminants back to the MGP. We want to find out if there are other buried sources that are derived from something other than the MGP (e.g., buried waste in the landfilled areas, potential chemicals used by the other industries along the shoreline, etc.).

The statement, "...the artesian conditions known to exist at Copper Falls Aquifer wells installed at Kreher Park confirms that this aquifer has no hydraulic connection with the near shore sediments" is too definitive and strong. **A connection of groundwater flowing up toward the sediments is certainly possible, and therefore, such a connection could exist.** If this aquifer is contaminated at the shoreline, it is certainly possible for contamination to discharge into the sediments and into the surface water. Therefore, the WDNR "policy" would stand.

Section 4.2.1.2, Page 4-7, Paragraph 4: EPA agrees that the approach to delineating ground water contamination in the fill, the Miller Creek Formation, the Copper Falls Formation, and the Oronto Sandstone can be an iterative one. Existing data from wells and piezometers installed previously (and in December 2003 and May 2004) should be used, along with some field based techniques. We highly recommend incorporating such fast track, field based techniques into this work plan. The assumptions that the plume is "thin" or that it is in "steady state" are not based on any quantitative data or definitive evaluation. Such broad assumptions should be qualified. The data summary and discussion in Section 2 is a more appropriate place to discuss the assumptions (and current conceptual site model with qualifiers). It is best to be clear about what data exists, what we **believe** it **may** mean and use that information to develop this follow-up investigation. This text should be deleted from this document. It is highly hypothetical. It is best to simply state that additional delineation is needed and an iterative approach will be used, starting with the shoreline piezometers and supplemented with various field-based techniques.

Section 4.2.1.3, Page 4-9: The text states that no soil vapor probe sampling is proposed for Kreher Park because there are no interior dwellings at the park, and therefore no potential risk. Is there any future plan for redevelopment of Kreher Park that includes office space or homes? If so, soil vapor probe sampling is recommended to assess future risk. The March 2002 Ashland Waterfront Development Plan actually calls for expansion of the marina, reuse of the existing treatment plant building to house marina support facilities, a community visitor center, and a Great Lakes Education and Meeting Center. Therefore, it is clear that the potential future risk from vapor intrusion into buildings needs to assessed.

Section 4.2.2.1, Pages 4-10 – 4-12:

Exhibit 4-2: Measurement endpoints should be included. Either the TRVs and their sources (preferably) for all assessment endpoints or the process for deriving them should be included.

When using the term Chemicals of Concern (COC) in this Work Plan, it should be qualified as "Potential" COCs because the established list may be refined subsequent to data collected as part of this work plan.

In the discussion concerning the Triad approach, it states that this approach determines unacceptable risk. This isn't accurate. It actually compares observed and predicted toxicity in the context of the present contamination. The text should read: "The Triad approach uses concurrent evaluations of sediment chemistry, invertebrate community analysis, and toxicity assays to evaluate the toxicity of sediment to benthos."

The detail of a Triad Evaluation should have been included. For example, the ecological conceptual site model should be provided that delineates distinct contaminant populations for which risk estimation and cost-effective remedial decisions will differ. The conceptual site model should be clear about what is already known about the site, and what the data gaps are. That is, the information already provided in Section 2 and 3 of the work plan should have clearly set up the conceptual site model based on the existing substantial database. The general data gaps are very clear as they were succinctly spelled out by the CSTAG. The data gaps concerning useability of historical data are not as clear. A clear and concise discussion should also be included concerning the historical data.

With regards to the Triad approach, and with regards to the Xcel request for stakeholder involvement early on, please note that EPA supports the adoption of streamlined approaches to sampling, analysis, and data management activities. Therefore, EPA supports the Triad Approach and would support this Work Plan being revised into a **more dynamic, streamlined work plan.**

Because both human health and ecological risk assessments were already completed for this project (in specific areas such as in the contaminated sediments and in Kreher Park, though some of the data did not meet all QA/QC requirements or was at detection levels that are needed), we have a good basis for streamlining this project with a good understanding of many aspects of this site. It is important to rework this work plan so that the conceptual site model is clear and the data gaps are clear. EPA welcomes a work plan that would: reflect a focus on decision-specific performance requirements, rather than inflexible adherence to traditional policies or "boiler plate" procedural checklists that do not add value or provide beneficial results; employ transparent and logical reasoning to define project goals, manage uncertainties, state assumptions, plan activities, and derive conclusions so that decisions are defensible; value technical proficiency in environmental practice; facilitate application of innovative technologies and strategies by logically evaluating project-specific needs, site conditions, and prior technology performance.

The goal of the Triad approach is to manage decision uncertainty, that is, to increase confidence that project decisions (about contaminant presence, location, fate, exposure, and risk reduction choices and design) are made correctly and cost-effectively. The foundation for site-related decisions that are both correct and optimized is the conceptual site model (CSM). A CSM uses all available historical and current information to estimate: where contamination is or might be located; how much is or might be there; how variable concentrations may be and how much spatial patterning may be present; what is happening to contaminants as far as fate and migration; who might be exposed to contaminants or harmful degradation products; and what might be done to manage risk by mitigating exposure. No where in the Xcel version of the work plan, nor in the SEH version of the work plan is the information clearly and concisely spelled out. This must be done, if this work plan is to be transformed into a dynamic Triad approach work plan.

The most important element of the Triad is systematic project planning (that is, this project planning that we are conducting now – between EPA, WDNR, Xcel Energy, the Bad River and Red Cliff band of the Chippewa Nation, NOAA and other natural resource trustees). The Xcel work plan has been provided to all of the technical stakeholders. Other stakeholders (citizens, local government, homeowners, business owners) will participate once we have a good working document. Their concerns and ideas are built into the Superfund Process --- we will go over our proposed sampling plan, keep them informed as to field sampling events, get their input regarding our assumptions. But, their input into the detailed technical aspects of the sampling program are not appropriate as suggested by Xcel. They rely on us (EPA, WDNR, Tribe, and Natural Resource Trustee scientists) for the technical expertise. The citizens may also request a Technical Assistance Grant to hire independent expertise to review documents as we distribute them. If our documents and work follow the Triad model, there is always opportunity to revise and adjust our work. Our community interview process in March 2004 highlighted concerns from all different parts of the community and that information is being factored into these work plan comments. Once the technical decision-makers are satisfied with the technical work plan requirements, we can proceed and continue to get input from other stakeholders as we keep them informed of our progress. If we use a "dynamic" work plan, we can always make adjustments as needed.

With regards to the discussion on sediment stability, the purpose of this evaluation is not simply to determine whether currently buried sediments can be remobilized by natural dynamics or boating activities. The conceptual site model should incorporate information on sediment as it relates to its existence within the environment in a relatively stable, low-energy, depositional environment or in a high energy unstable, erosional environment and also include the natural conditions, as well as the man-made ones (not just boating, in this case, but also the affects of man-made jettys, etc.).

Sediments may be subject to erosion or transport by natural or man-made disturbances such as floods or engineering changes in a waterway. Because sediments may experience temporal, physical, and chemical changes, it is especially important to understand what contaminants are currently available to humans and wildlife, and whether this is likely to change in the future under various scenarios.

This work plan should clearly describe the conceptual site model for this site based on all of the currently available data. Clearly answer these questions:

What do we know about the sediment? Where did we take samples before and where didn't we take samples? What kind of samples did we take? Is this information adequate? How do we know that only this one inlet is contaminated? Is it possible for the areas outside the inlet to be contaminated? Figures in Appendix B certainly indicate the existence of contaminants outside of the jetty areas and certainly indicate that the extent of sediment contamination has NOT been ascertained. How does the lumber and mineralized wood chips affect the natural sediment and its transport? Do the PAHs tend to stick more to the wood than the natural sediment? How does this effect contaminant transport? How did the contamination get there in the first place? Is contamination still entering the inlet? How is it being transported now? Is there a depositional area that has remained in tact for the last century? Is the material being slowly transported out of the inlet? If so, where is it going?

A good conceptual site model needs to be fully specified in this document in order for us to have a good dynamic work plan.

The following is suggested text and information that should be utilized for putting together the clear and concise conceptual site model.

According to previous work completed by the WDNR this is what we know about the chemistry of the sediments:

1996 data showed that a variety of PAH compounds (a subset of SVOCS including but not limited to acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene) and VOC compounds (including benzene, ethylbenzene, toluene, and xylenes) exceeded several sediment quality guidelines (SQGs). Metal concentrations did not exceed guideline values at any of the sampling locations. At one location total cyanide exceeded a sediment quality guideline.

Further studies designed based on the 1996 data were conducted between 1998 and 2002 to evaluate ecological risks associated with the contaminated sediments. Both sediment and surface water samples were analyzed for SVOCs (PAHs) and VOCs. Sediment samples collected in 2001 were also analyzed for HAHs and phenolic compounds.

The additional studies confirmed that contaminant concentrations in sediments and surface water exceeded ecological guideline values for several SVOCs and VOCs. Toxicity testng results and a benthic macroinvertebrate survey, along with the chemistry data shows that there is clearly an impact on the benthic community from the PAH concentrations within the sediment.

All of the data obtained through the WDNR program was validated in accordance with EPA protocols. Validation of chemical laboratory data indicated that most SVOC and VOC data was valid for use in Superfund risk assessments. However, the validation also indicated that the 1996 chemical analyses for metals and cyanide could not be utilized.

Additional sediment samples collected in winter 2003 at locations shown on Figure 7 were analyzed for VOCs, SVOCs, various metals, and cyanide. As shown in Table 5, VOC and SVOC concentrations continue to exceed guideline values. In contrast to the 1996 results, many of the 2003 sediment sample results exhibited SQB exceedances for copper, lead, mercury, zinc, and cyanide.

Review of the recent sampling results and past data indicate that potential COCs for proposed ERA studies should include VOCs, SVOCs, copper, lead, mercury, zinc, and cyanide. Acid Volatiles Sulfides and Simultaneously Extracted Metals (AVS/SEM) analysis is also recommended to evaluate if the metals are bioavailable.

Further evaluation of HAHs and phenolics is not recommended at this time because as concluded in the 2002 ERA report, these compounds are generally co-located with much higher concentrations of PAHs and VOCs, the hazard quotients for the PAHs and VOCs were generally much higher, insufficient sediment benchmark data is available for HAHs and phenolics, and standard analytical methods are not available for HAHs.

This is what we know (and don't know) about source, fate and transport of contaminants and risk at the upland and sediment portion of the Site:

The primary sources of contamination identified to date are related to the former MGP, the filled area materials (potential for various waste materials) including the potential dump, the former WWTP, the historical open sewer, and former lumber or sawmill operations.

The following describes the chemical composition associated with raw materials and wastes from each of the potential sources identified to-date.

<u>Lumber/Wood Products Industry</u>

The subject property was used by the lumbering/wood products industry from the 1880's through the 1930's. The potential exists that some treating of wood products may have occurred during that time period. Research on the history of wood treating indicates that wood treating for preservation has changed throughout this time period and was unregulated with regard to specific material and treatment procedures.

In general, the early wood preservative methods included dipping or direct application of metallic salts and coal tar materials. The coal tar materials used were by-products generated from the manufacturing of coal gas and were not processed further prior to use. Many facilities utilized coal tar/kerosene mixtures. By 1930, true creosote was being actively distilled from coal tar to remove the volatile fraction (<210 degrees C boiling point) and heavy oils (>450 degrees C boiling point). The resulting true creosote is comprised primarily of 18 polycyclic aromatic hydrocarbon compounds (PAHs.)

The components of creosote with boiling points below 210 degrees C generally make up less than 2% of whole creosote. These components include VOCs and other aromatic hydrocarbons.

Manufactured Gas Plant

The St. Claire Street manufactured gas plant operated from 1887 through 1947. Historic Sanborn Maps indicate that earlier processes at the St. Claire Street MGP used coal carbonization methods followed by the Lowes carbureted water gas process in later years. The production of coal tar is a by-product of the coal carbonization and carbureted water gas (CWG) processes that were used in the manufacturing of gas in the early part of the 20th Century.

Five waste streams and several chemicals of concern have been identified based on a survey of 33 MGP sites according to a Gas Research Institute document titled "Management of Manufactured Gas Plant Sites.

Filled Areas/Manmade Land

The site was constructed through the placement of fill materials at the base of the former lakeshore bluff from the 1870's (or earlier) until the 1970's. The majority of the fill materials reportedly included slabwood and sawdust and were associated with the operation of the lumber mill. However, other reports indicate the disposal of municipal solid wastes, fly ash and earthen fill materials may have occurred in various areas, particularly the west lakeshore area. There exists the possibility that other waste materials were dumped on the property by unauthorized individuals.

A copy of an original blue print of the WWTP dated 1951 identifies an area labeled "Coal Tar Dump" approximately 70 feet south of the preliminary sedimentation tanks at the former WWTP (Greeley & Hansen, 1951). Also shown on the plan is a 12 inch corrugated pipe extending from the "Coal Tar Dump" area northwest to the shoreline. Aerial photographs from 1939 and 1951 do not identify a dump on the site (SEH 1994). Contamination from wood treatment would likely include the heavier SVOC compounds originating from coal tar or creosote. Unfortunately, the period of time when wood treatment could have occurred at the "coal tar dump" corresponds with the time frame when creosote formulas varied widely.

WWTP

The former City of Ashland municipal wastewater treatment plant (WWTP) is located on filled land on the southeast edge of the bay. The WWTP was constructed in 1951 with an expansion of the facility in 1973. Expansion of the facility included the addition of aeration tanks and a chlorine contact system prior to effluent discharge to the bay. The WWTP discharge pipe outfall does not appear to have changed with expansion of the facility. The location of the former WWTP discharge pipe is approximately 1750E-2500N. Reportedly all waste associated with the operation of the plant including sludge was treated and hauled to a licensed landfill. The facility operated from 1954 through 1992. Effluent discharge from WWTP facilities is highly dependent upon the industries serviced by the utility.

Historic Open Sewer

A historic open sewer was first identified on a Sanborn Fire Insurance map dated 1901. A trench was observed in a manmade fill area, to the west of the sawmill. The ground is first labeled as "slab wood" on the 1901 Sanborn, and "filled ground" and "slab piling yard" on the 1909 Sanborn and later editions. The trench does not appear to have a specific source, but discharges directly into Chequamegon Bay (SEH 1994). To date, there is no specific contamination associated with the historic open sewer.

In summary, investigation results to-date indicate extensive soil and groundwater contamination in the upland and ravine area near the former MGP, and in the landfilled area (including Kreher Park). Groundwater contamination has also been identified in the fill and in the Copper Falls Aquifer, and sediment contamination has been identified in approximately ten acres of sediment located adjacent to Kreher Park. The contaminants identified during the investigations are predominantly SVOCs and VOCs. Some metals contamination has also been identified at some locations.

The human health and ecological risk assessments previously performed at the Site have limitations. Most of the data had not been collected under the correct analytical quality documentation level and at times, risk calculation was based on a **limited sample size.** While all of the environmental data were reported in appropriate units, only about 400 samples were reported with an adequate level of detail for a formal data validation of SVOC measurements and fewer samples for other parameters. **Many of the validated samples required no modification.** However, EPA identified numerous minor surrogate and analyte spike outliers that necessitated the application of "J" qualifiers to associated analyte detects and "UJ" qualifiers to associated analyte non-detects. Each of these qualifier flags indicated the potential for analytical inaccuracy or imprecision. **EPA rejected ("R" flag) few of the results for project purposes.**

All of the validated data were generated by EnChem, Test America, and Northern Lake Services or Northern Lake Services/US Filter. All of the unqualified data were deemed admissible for current and future project purposes. In addition, all data qualified as estimated using the "J" and "UJ" flags were deemed useable by EPA for current and future project purposes provided the data user considers the implications of potential inaccuracy; e.g., critical qualified data points might benefit from an evaluation of regional data trends evident from proximate sampling locations. Conversely, rejected non-detects for benzo(g,h,i)perylene and Aroclor PCBs were inadmissible for project purposes.

The sample specific validation findings were applied to the larger historical data according to several guidelines. These included:

Unvalidated data from EnChem, Test America, and Northern Lake Services or Northern Lake Services/US Filter were acceptable for current and future project purposes if the associated method and analyte were unqualified in the validated data set. For example, no qualifiers were required for VOC data generated by Test America. Therefore, unless QC outliers were present, the unvalidated data from Test America were admissible for project purposes.

Unvalidated data from EnChem, Test America, and Northern Lake Services or Northern Lake Services/US Filter were acceptable for current and future project purposes if the associated method and analyte were associated with isolated QC outliers that were not repeated among the validated data. For example, the recovery of naphthalene in one matrix spike sample from EnChem exceeded the applicable QC limits. However, naphthalene was recovered within QC limits in a second matrix spike sample. Therefore, poor naphthalene recovery was not a sustained analytical problem and did not require the extension of data quality flags into the unvalidated data set.

QC parameters evaluated only once during the EPA data validation process had a slightly more conservative application. For example, EPA validated only one laboratory control sample (LCS) among the SVOC data generated by Northern Lake Services. This single LCS demonstrated analytical problems with the measurement of naphthalene and phenanthrene. In the absence of an additional LCS with acceptable naphthalene and phenanthrene recoveries, no data were evaluated to determine if the naphthalene and phenanthrene outliers were recurrent or batch specific. Consequently, the EPA proscribed flags for naphthalene and phenanthrene in the associated sample batch were also applied to unvalidated SVOC sample results from Northern Lake Services.

Unvalidated SVOC, acids, and bases measured by EnChem using EPA 8270 would be admissible. However, detected concentrations of acenaphthylene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene would receive "J" flags. Undetected levels of these SVOC would receive a "UJ" qualifier with the exception of benzo(g,h,i)perylene, which would receive an "R" qualifier. Accordingly, all of the EPA 8260 concentrations from EnChem would receive qualifiers while the EPA 8260 data from Test America would not.

Qualifiers applied to the unvalidated data from EnChem, Test America, and Northern Lake Services or Northern Lake Services/US Filter, can be changed if project participants can demonstrate that the flag is not applicable based on the results of subsequent data validation. Similarly, data from a laboratory other than EnChem, Test America, and Northern Lake Services or Northern Lake Services/US Filter, will not be used for regulatory compliance unless it is independently validated using EPA guidelines for data validation. Historic data from parameters or methods not considered in the EPA validation process will also not be used for regulatory compliance unless independently validated.

An offshore contaminated sediments investigation was conducted March 11, 2003 through March 27, 2003. The offshore sediments located immediately adjacent to the site have been impacted by a wide range of SVOC contaminants and by VOCs (primarily BETX compounds). Generally, the extent of offshore contamination identified at the site to-date is contiguous with the north shoreline and extends offshore forming three undulating lobes

The historic contaminant delineation has been limited by several factors. Elevated detection limits from historic site data prevent contaminant delineation to the current Preliminary Remediation Goal (PRG) values. The early samples analyzed under CLP Level II protocol are not acceptable for conducting risk assessment. In addition, evaluation of remediation alternatives and engineering design of the remedial alternative will also require data that has passed a Level IV data validation.

Much of the historic data is limited to screening purpose usage. The limited number of existing CLP Level IV samples in areas of lower contaminant concentration prevent accurate contaminant delineation in these areas. The purpose of the Winter 2003 sediment sampling event was to collect additional sediment samples in order to complete sediment contaminant delineation at the site as well as identify contaminant iso-concentrations that are be required for future ecological risk assessment testing.

In addition to horizontal sediment contamination delineation, samples were collected at depth to provide vertical definition of sediment contamination related to the PRGs. Insufficient data has been gathered to date on sediment background concentrations of contaminants and inorganic analytes in the sediment. This data is required to rule out contaminants of potential concern, further assess remediation requirements, and conduct ecological and human health risk assessment at the site. **SVOC/NAPL characterization is further needed to determine if the SVOC contamination at the site is from one or more sources.**

A total of 84 discrete sediment samples were collected from 49 locations within the sediment. Collection and analysis of the sediment samples was conducted in accordance with the Task Specific –Winter 2003 Quality Assurance Project Plan (QAPP) dated February 25, 2003. Analytical samples were collected for SVOCs, VOCs, and inorganic parameters.

Of the 84 sediment samples collected, 42 samples were collected from the sediment surface (0-6" depth), 24 samples were collected from various depths in the 2 to 12 foot depth interval, 5 surface sediment samples were sent to Battelle laboratories for forensic fingerprinting analysis, 7 samples were collected as background surface sediment samples and 6 samples were background samples collected from the 2 to 12 foot depth interval.

Select 8260B Volatile Organics

All volatile organic data was usable as reported without qualification or usable and qualified as estimated. Volatile organic results were qualified as estimated from a low method bias or matrix effect as evidenced by low surrogate recoveries and/or low MS/MSD recoveries. In addition, volatile organic results were qualified as estimated from a matrix suppression effect as evidenced by low internal standard area counts.

Select 8270C Semivolatile Organics

All semivolatile organic data was usable as reported without qualification or usable and qualified as estimated. Semivolatile organic results were qualified as estimated from unstable calibration as evidenced by initial and/or continuing calibration variability. In addition, semivolatile organic results were qualified as estimated from a matrix suppression effect as evidenced by low internal standard area counts; low and variable LCS/LCSD and/or MS/MSD recoveries; or high and variable MS/MSD recoveries.

Metals

All metals data was usable as reported without qualification or usable and qualified as estimated. Metals data were qualified as estimated from out of limit and/or variable MS/MSD recoveries. In addition, metals data was qualified as estimated from physical and/or chemical interferences in the sediment matrix as evidenced by serial dilution imprecision and lab duplicate imprecision.

Solids, Cyanide, Hexavalent Chromium and TOC

All solids data was usable as reported without qualification.
Cyanide data was usable as reported without qualification or usable and qualified as estimated.
Cyanide data was estimated from low and variable MS/MSD recoveries.
Hexavalent chromium in all sediment samples was estimated, likely biased low from a matrix effect as evidenced by low and variable MS/MSD recoveries.

All TOC data was usable as reported without qualification or usable and qualified as estimated. The mean TOC value reported was qualified as estimated from imprecision as evidenced by two variable TOC values measured in the samples. In addition, some TOC values were qualified as estimated from a method bias as indicated by high or low MSD recoveries.

New data collected during the Winter 2003 Sediment sampling event was validated. Analyzed samples were validated by an SEH contractor at the rate of 100% of samples collected. **All analyzed results were determined useable for regulatory purposes.**

Though a re-evaluation of human health risk and ecological risk must be conducted, a preliminary evaluation of Human Health Risk follows, in part, based on the preliminary 1998 HHRA findings, bearing in mind some of the data limitations.

1998 HHRA

A Baseline Human Health Risk Assessment (HHRA) of the Kreher Park area and off shore sediments was performed by SEH in 1998. The tabulation of both current and future predicted risk was conducted for both reasonable maximum exposure (RME) and mean or central tendency exposure (CTE) concentrations. Populations considered at that time include city workers, recreational adults, adolescents, and children, and trespassing adolescents to the seep area.

Results of that HHRA indicate that there is significant carcinogenic risk in excess of the Wisconsin Administrative Code (Wis. Admin. Code) standards. Cumulative risk is defined in ch. NR 720, Wis. Admin. Code specifies that the excess cancer risk may not exceed 1×10^{-5}; the non-carcinogenic hazard index may not exceed one.

Significant risk was demonstrated to occupational workers while performing utility work in the Kreher Park area for both carcinogenic and non-carcinogenic compounds. Risk is indicated primarily through dermal contact with groundwater including seep water (the major seep has at this time been capped). Risk to city workers is also indicated through incidental ingestion and dermal contact with subsurface soil.

Significant risk was demonstrated for both carcinogens and non-carcinogenic compounds to recreational adults, adolescents and children while engaged in activities such as playing at Kreher Park, swimming, boating, and fishing. Risk is indicated for dermal contact with surface soils, and off shore sediments.

Significant risk was demonstrated for both carcinogenic and non-carcinogenic compounds to all populations exposed to seep water, primarily through dermal contact. However, in May 2002 URS completed an interim remedial action to cap the seep discharge at Kreher Park. Seep water is no longer available for exposure and the pathway to humans is no longer complete. Similarly, a significant risk was demonstrated to adolescents trespassing on the posted area surrounding the seep. With the interim action capping of the seep, this pathway is also no longer complete. At the time of the 1998 HHRA, trespassing was only referring to the seep area. It did not include other posted areas such as the bay water or the WWTP.

An HHRA has not been conducted in the area on or surrounding the former MGP (the Upper Bluff area). Surface and subsurface soils and ambient air concentrations in the Upper Bluff area have not been adequately characterized to date. Therefore, a determination cannot be made at this time as to the degree and extent of contamination. Populations and pathways that may potentially be at risk include:

Occupational Workers

The risk to City of Ashland utility workers may be from incidental ingestion of potentially contaminated surface and subsurface soils and groundwater; dermal absorption from surface and subsurface soil and groundwater; and inhalation of volatilized compounds as well as surface and subsurface particulates. In addition, literature research has indicated that some SVOC compounds produce acute phototoxic effects. These effects include rashes and chemical burns. The likelihood of contact with free product that contains many of the SVOCs that produce phototoxic effects increases with groundwater and subsurface soil locations

The risk to construction workers while completing surface activities or subsurface excavation would be the same as that of utility workers.

The risk to Xcel Employees may be from incidental ingestion of potentially contaminated surface soil; incidental ingestion of subsurface soil if required to perform subsurface activities; dermal absorption from surface or subsurface soil; inhalation of volatilized compounds from enclosed indoor areas; and inhalation of potentially contaminated soil particulates.

Trespassers to the Xcel Property

The risk to unauthorized visitors to the NSP property may be an acute risk from incidental ingestion and dermal absorption of contaminated surface soils, and inhalation of potentially contaminated surface soil particulates.

Church/School Occupants
The risk to students and teachers attending school or church-goers may be from inhalation of volatilized compounds in enclosed spaces of the buildings. A potential risk may be posed by contaminated surface soils in the playground area of the school. The area has not been adequately characterized to determine risk at this time.

Groundwater
Two artesian wells exist on the site that appear to draw water from the Copper Falls aquifer. However, the construction records for these two wells have not been located and it is possible that the water can be drawn from anywhere in the subsurface, from the fill, down to the bedrock. These wells are currently used by the general public (recreational users at the park and marina) and some residents have reported to EPA that they collect containers of this water for consumption and other residential uses. It has been established that NAPL constituents have been found in the Copper Falls Aquifer. Analytical samples of the artesian water have not indicated contamination to date. **However, the samples have not been collected under Level IV protocol nor validated.**

In addition to the risks at Kreher Park that were addressed in the 1998 HHRA, an additional population and route of exposure may pose risk. Warning signs against entry are posted at the WWTP buildings and the buildings are secured. However, trespass to the property is a possibility. Recently, in May 2004, a section of fence was broken and lay on the ground allowing easy entry to the WWTP. The risk to trespassers to the WWTP property may include ingestion and dermal contact with groundwater that has seeped into the building and containment structures on the property. A risk may also be posed by inhalation of volatilized compounds within the WWTP building. The possibility exists for acute phototoxic effects from dermal contact with free product or SVOC compounds.

Chequamegon Bay Sediments

Warning signs are posted on the shore of Chequamegon Bay on the Kreher Park property. People that enter the water are considered to be trespassers. Activities these trespassers may engage in may include swimming, boating, wading, or fishing. All of these activities have the potential for disturbing the contaminated surface sediments either by directly stepping into the sediments or by agitation from equipment such as anchors or boat propellers. Risk to trespassers posed by these activities include: dermal contact with contaminated surface water, surface sediments, contaminated wood waste, and free product NAPL; incidental ingestion of contaminated surface water; and inhalation of volatilized compounds. In addition, a risk from acute phototoxic reactions exists due to dermal contact with free product or SVOC compounds released from the surface sediment or wood waste.

Preliminary Ecological Impacts Evaluation

In 1998, SEH completed an Ecological Risk Assessment (ERA) of the contaminated sediments adjacent to Kreher Park. The 1998 ERA concluded that strong evidence exists that the current and future ecological risks associated with the contaminated sediments are high.

A supplemental ERA was performed in 2001 to further validate and support conclusions regarding the ecological impacts from contaminants of concern in the sediment portion of the site, and to aid in determining clean-up goals for the sediments.

A weight-of-evidence approach was utilized to assess the potential existing and future ecological risks associated with the contaminated sediments to the benthic, aquatic, and terrestrial communities. Weight of evidence was accumulated in 1998 by several means including: 1) a literature search conducted to select relevant sediment effects benchmarks for evaluation of site data and identify ecological effects documented at other sites with similar contaminants and exposures; 2) sediment samples collected, analyzed, and compared to sediment effects benchmarks for the contaminants identified; 3) a survey conducted of the benthic community at contaminated and reference locations; 4) a series of laboratory bioassay toxicity tests conducted to characterize the effects of short term exposure to the contaminated and reference sediment samples; and 5) collection of fish for analysis of tissue chemical concentrations.

Sediment Chemical Data Evaluation

Chemical data was converted to toxic units to evaluate the cumulative effects of different chemicals in the contaminant mixture exiting in the sediments. Chemical data, sediment survey results, and toxicity study results were integrated to assess the level of ecological risk associated with varying exposure levels at the site. The results of both bulk sediment dilutions and sediment elutriate dilutions were used to strengthen the exposure response characterization, and extrapolated to evaluate the potential effects across the contaminated sediment area with respect to the larger database of SVOC and VOC concentrations.

Several sets of sediment effects benchmarks were identified in the literature search. Sediment chemical data was compared to several sets of probable effects levels for both dry weight units and normalized-to-organic-carbon (NOC) units. SVOC and VOC benchmarks were exceeded for several chemicals at several locations in the shallow bioactive zone sediments and deeper sediments. Based on this comparison, it was concluded there was a high probability of adverse effects to aquatic life from the contaminated sediments.

A water column sample collected during a 3-foot wave period exhibited SVOC concentrations which exceeded secondary acute and chronic water quality criteria values.

Comparison of the site SVOC concentrations to data in the literature from other sites indicated that SVOCs may be accumulating in resident fish species, especially bottom feeders. Exposure of fish to the SVOC contaminants that produce mutagenic effects may result in fish tumors, impaired health, and ultimately, death. Results of 1998 fish tissue sampling revealed the presence of SVOCs in fish collected form the site.

Benthic Community Evaluation

Benthic community surveys were conducted in 1998 at two contaminated stations and two reference stations. Benthic community survey results were evaluated for richness, abundance, and relative indices. Graphical analyses indicated that the community degradation as reflected in differences in indices between the reference and contaminated sites strongly correlates to the sum of dry weight toxic units for the SVOC mixtures.

Bioassay Toxicity Study Evaluation

Bioassay toxicity studies were conducted in 1998 on several sediment samples collected from the same two contaminated stations and reference stations. Bulk sediment toxicity tests were conducted on the following benthic species: *Hyallela azteca, Chironomous tentans*, and *Lumbriculus variegates*. Sediment elutriate preparations from these sites were used in tests on *Pimephales promeles* and *Daphnia magna*.

Supplemental bioassay toxicity studies were conducted in 2001 using *Hyallela azteca, chironomous tentans*, and *Pimephales promeles* exposed to bulk sediments collected from four contaminated stations and two reference stations. Parallel tests were conducted utilizing a dilution methodology in which various proportions of sediments from impacted sites were mixed with sediments from reference sites to obtain a range of exposure concentrations.

Test results were evaluated for effects on survival and growth, and graphically compared to toxic units. Statistically significant differences in survival and/or growth were documented between each sample. Toxic effects appeared to correlate well to toxic units. Results from both the bulk sediment dilution tests and the sediment elutriate dilution tests supported the exposure concentration/effects characterization.

Results of literature search indicated that the toxic effects of certain SVOCs may be enhanced by exposure to the ultraviolet (UV) component in sunlight. Comparison of phototoxic SVOC concentrations at the site to reference levels in the literature indicated it was likely a phototoxic effect could be present at the site. Phototoxicity studies were performed in 1998 and 2001 in conjunction with standard toxicity test organisms exposed to bulk sediment or sediment elutriate samples collected form the site. Evidence of enhanced phototoxicity effects were shown for benthic organisms, zooplankton, and fish larvae.

Risk Characterization

The weight of evidence indicates that a strong potential exists for ecological risks to be high associated with the contaminated sediments in the bioactive zone and contaminated surface water over this zone. The weight of evidence includes: 1) coal tar-related contaminant concentrations in sediments exceeding several independent sediment effects benchmarks; 2) evidence of benthic community impairment in the contaminated areas as documented in field studies; 3) results of standard and photo-enhanced bioassay tests that indicate that the probability of ecological effects increase with exposure to increased contaminant concentrations in sediments and surface waters over the sediments; 4) the exceeding of secondary acute and chronic water quality criteria during heavy wave action, based on field sampling and in laboratory settling studies; 5) sediment concentrations of SVOCs similar to those at other sites where bioaccumulation and mutagenic effects have been observed; and 6) evidence of SVOC in fish tissues collected from the site.

The sum of toxic units for SVOCs in the deeper sediments appears to be significantly higher than in the surficial bioactive zone. Future disturbance and exposure of the deeper contaminated sediments to the sediment-water interface and water column by either natural (e.g., storms, ice scouring) or uncontrolled anthropogenic (e.g., boat prop wash, shoreline maintenance) forces could potentially result in significant ecological impacts in and possibly beyond the localized contaminated sediment area.

Ecological impacts to the benthic organisms may include acute and chronic toxic effects from direct contact with an ingestion of impacted sediments, food, and water. Impacts to the fish community could include acute and chronic effects from ingesting contaminated food, or direct contact with contaminated sediments and water. Immature fish and eggs are expected to be especially susceptible to acute effects based on the results of the photo enhanced toxicity studies. Another potential impact to the fish community is the loss or reduction of the lower level benthic community food source in the contaminated area. Likewise, the terrestrial community may suffer from exposure to the contaminated water and sediments, ingestion of contaminated food, or loss or reduction of food sources.

Based on integrating and weighing all lines of evidence collected from all the steps and years of the ecological risk assessment process for the sediment portion of the Lakefront site, Preliminary Remediation Goals (PRGs) for the contaminated substrates present (wood chips and sand) were developed. Recognizing the uncertainties associated with the ecological risk assessment process prompted the establishment of what are believed to be scientifically sound, and as appropriate reasonably conservative, clean-up goals to protect the biotic resources of the embayment off the Lakefront property, Chequamegon Bay, and in turn the unique Lake Superior ecosystem.

Section 4.2.2.2, Page 4-13: This section should have provided all of the information (mentioned in the previous comment) about what we know about sediment contamination. The data that we have, the data we're missing, and what the existing data already tells us about sources, contaminant fate and transport, and risks. Two and three dimensional pictures showing what is known (and not known) would be part of the conceptual site model. Figures as provided in Appendix B are an excellent start.

Section 4.2.2.3, Page 4-13: Delete the term Area of Concern. It need only be referenced as the sediment. Revise the last paragraph as follows:

The objective of the Triad approach is to incorporate site-specific ecological effects information to determine if the COC concentrations in sediment have adverse effects on benthic invertebrate communities. The conclusions developed from the Triad approach will be used to support remedial decision-making for the Site.

Exhibit 4-1: The word "Analysis" in the title should be changed to the plural, "Analyses." Remove the term AC.

Section 4.2.2.3.1, Page 4-14: As discussed above concern the Triad approach, a clear conceptual site model is also essential to establish a dynamic work plan that will answer the data quality objectives we have for this site.

Section 4.2.2.3.1.1, Page 4-15: Delete "AC" and just refer to the sediment and surface water contamination in the inlet. What is the evidence for the statement that "even in the absence of contamination, the abundance and distribution of benthic invertebrates is likely to differ in sediments containing wood waste relative to mineral substrates." Has a wood substrate reference area been subject to a community survey? If so, provide the data and findings in this section. If not, such a habitat study needs to be performed. See comment below. EPA is in favor of a field based, dynamic approach for selecting sampling locations. However, an effort should be made now, to estimate locations and use this "baseline" as a tool in the field. Based on previous WDNR work, where else would samples need to be taken? For example, surface sediment concentrations should be verified in the areas we think are depositional (the two near shore lobes), locations that are thought to be depositional should also be looked at from a depth perspective – can undisturbed cores be taken? This would give us information on the length of time the area has been depositional. If no undisturbed cores can be taken, this may be indicative of sediment and contaminant transport. Outside the current zone defined as contaminated based on past studies, where else should samples be taken? For example, in the marina, along the swimming beach, etc. It is important to demonstrate the presence of absence of contamination in other areas which seem like they could very well have also been contaminated.

Section 4.2.2.3.1.2, Pages 4-16 - 4-17: In order for both silty and woody substrate to be adequately characterized, it is recommended to have at least 4 reference sampling stations located in each substrate type. It may or may not be the case that 3 reference sites will be sufficient to adequately characterize background conditions of the area. Additional statistical and qualitative justification for 3 sampling stations should be provided. However, as previously stated, at least 4 reference sampling stations per substrate type are recommended. Again, selection of reference areas should be made at this time, with the notion that we have a "dynamic" work plan subject to change in the field. Locations that have no coal tar or wood treatment type waste along an inlet should be used. An area that has the mineralized wood chips mixed in with the "clean" sediment should be found, now, before the field crew is mobilized.

In the section with bullets, please note that reference area sediments **are historically uncontaminated relative to the study area sediments.** (They do not have lower concentrations of COCs – this could indicate that the area selected as a reference area is being impacted by the site, or is impacted from some other site). The reference area must be essentially clean. In addition, methods used to collect data at the control area should not simply be "comparable; " they should be exactly the same.

Section 4.2.2.3.1.3, Page 4-17: Remove the term "AC." Delete the qualifier statements that aren't necessarily accepted. For example, delete, "Of the many techniques for making comparisons between entities, none is better grounded than the method of general linear models."

Use the following text:

"General linear models (GLMs) include t-tests, analysis of variance (ANOVA), analysis of covariance (ANCOVA), linear regression, and other methods which take the form of the general model. While GLM does make particular assumptions about the data (e.g., observations are independent, variances are equal, errors are notrmally distributed, etc.) it is robust to mild deviations from these assumptions. GLM analysis will permit testing for differences between contaminated and reference sites that also differ in other attributes such as sediment texture, depth, and amount of woody debris in the sediments. ANCOVA allows removal of the effects of these potentially confounding variables, so that their contributions to variance in community structure will not confound differences, or lack of differences, between contaminated and reference sites. For this study, alpha, the probability of rejecting a null hypothesis when it is actually true, is set at 0.05. Beta, the probability of failing to reject a null hypothesis when it is actually false is set at 0.2; thus the power (1-beta), the probability of rejecting a false null, is set at 0.8.

Preliminary data on benthic invertebrates from the SEH benthic study (1998) were used to generate estimates of within reference group mean and standard deviation for the following variables: total number of mollusks and crustaceans (m+c); total number of species found (S); and total number of individuals found (N). These last two variables, S and N, are components of species diversity indices (e.g., Shannon-Wiener, Simpson) and are estimators of species diversity in a community (Magurran, 1988). Thus they have some utility in characterizing overall benthic community structure.

For an initial power analysis (using SYSTAT v. 10.03; Dallal et al. 2000) a one-way ANOVA was chosen as the model. Power analysis, the statement of the probability of rejecting a null hypothesis (e.g., of no difference between contaminated and reference sites) when that hypothesis is false, is also straight forward with GLM. Power analysis allows the computation of the number of samples required to detect a difference (effect) of a stated size. Power analyses were conducted on raw means and standard deviations from the preliminary data from the reference stations (SEH 1998), as well as means and standard deviations of ranked data, just in case this transformation will be needed in the final analysis of the data. These power analyses are presented in Appendix D, along with the means and standard deviations used in the analyses. Generally speaking, a balanced design requires approximately 17-20 samples each from both the contaminated inlet and from the reference sites to meet the standards set *a priori* for detecting differences in benthic community variables. Fewer samples would reduce the power below 0.8 or increase the size of the difference that could be detected as significant at alpha=0.05.

The experimental design selected to evaluate the effects of contaminants on benthic community structure will be a randomized block design: in the contaminated area, eight stations will be selected along a total PAH gradient from approximately 2 µg/g to 400 µg/g, and five replicate samples will be randomly taken from the vicinity of each station, giving a sample size of 40 from the contaminated area. Three reference areas will be selected, and five replicate samples taken from each, for a total sample size of 55. As the noncentrality parameter required for power analysis is the same for treatment effects in a randomized block design as it is for effects in a one-way ANOVA (Dallal et al. 2000), the results of the initial power analysis are applicable to the randomized block design, the additional samples (55 versus 34-40) compensating for the unbalanced design with increased sample size.

The reason an unbalanced design with more samples from the contaminated area was chosen was so that in addition to potential differences between reference and contaminated sites, trends within the sediment, (e.g. changes in benthic structure with increasing concentrations of total PAH) may be elucidated using ANCOVA models. These models can not only quantify change, t hey can also remove covariate effects such as depth and substrate type which would potentially confound the relationship between total PAH and community structure. Using the proposed randomized blocks design with sample size of 40 in the sediment AC, these ANCOVA models are also quite powerful."

Three reference areas with five replicate samples totaling 55 samples have been stated in this section. Describe how 55 samples were derived (three reference areas with five replicates gives a total sample size of 15). It is stated that taking 17 to 20 samples per location is **economically infeasible**. This claim must be substantiated before it can be accepted as fact. If a smaller sample size is proposed, it must be shown to meet the Data Quality Objectives. The purpose of establishing a statistical sampling program is just that, a way to minimize the number of samples – and get the information needed, specifying a certain level of certainty or uncertainty. A statistical sampling design must be structured on the Data Quality Objectives. The statistical design discussion needs to be more clearly worded, with an emphasis on the apparent reduction in sample size from 17 to 20 down to 5 per location. We must come up with a plan that meets the Data Quality Objectives, which are not clearly specified in the document as it is currently written. It is also not clear how far apart the sampling locations are, which side of stations the samples will be taken from, and will the reference areas be natural substrate (mineral) and one with wood?

Section 4.2.2.3.2, Pages 4-20: Revise the second paragraph as follows:

It is critical that a study design carefully consider the natural variability of environmental factors that determine the structure of benthic community (e.g., substrate type, water velocity, and depth) as well as the effects of biological factors (e.g., predation, competition and reproductive strategies). Clearly defining these microhabitat characteristics and avoiding comparisons between communities occurring in dissimilar habitats reduces data variability and improves the confidence in conclusions drawn from benthic community data (Scwenneker and Hellenthal 1984; Mason et al. 1983; Chutter and Noble 1966).

Section 4.2.2.3.2, Page 4-21:

First Paragraph revise as follows:

The number and spatial distribution of Triad stations has been expanded to better account for confounding variables such as substrate grain size, the presence of wood waste, water depth, etc.

Delete "Incorporating these variables…." to the end of the paragraph.

Does the third paragraph refer to Principle Component Analysis?

The statistical method to be employed must be determined before analyses begin.

What are the categories for qualitative comparison?

Section 4.2.2.3.3, Page 4-22: Delete the first paragraph. This section should simply state that:

A 28-day Chironomous tentans assay will be conducted to supplement the previous 28-day Hyalella azteca toxisity assay (2001). Bioassay stations will be co-located with the benthic community stations.

Delete "The alternative of not conducting a new sediment bioassay would require that at least some benthic community stations for this phase of the study occupy the 2001 bioassay stations (SEH 2002) to minimize any uncertainty introduced by spatial variability. Regardless, there would be uncertainty resulting from potential temporal variability between the 2001 toxicity assay and the C. tentans assay."

Delete the portions describing why Xcel does not want to conduct UV studies. We will discuss the UV studies and come to a consensus and the revised work plan will simply reflect the work that will be performed.

The Trustees have indicated that UV tests may be necessary because this is an important mechanism for toxicity. Lab assays are always simplified versions of field situations. So, this could be an important means of determining injury pathways.

UV light is a non-contaminant parameter that can affect toxicological responses to contaminants like PAHs. Other parameters that will affect toxicity tests include sediment grain size, total organic carbon, ammonia, acid volatile sulfides, and total solids. These parameters should also be analyzed for and considered in the evaluation of sediment toxicity. If testing under UV is not to be performed, how will this parameter be controlled for in the evaluation of toxicity?

Please note: Increased toxicity of PAH-contaminated sediments to benthic organisms in the presence of UV light has been demonstrated in both the laboratory (Ankley et al. 1994) and in the field (Monson et al. 1995). It is reasonable to assume that association with sediment may reduce UV exposure for infaunal benthic organisms, but this does not reduce UV exposure to zero. For this reason, a risk pathway or mechanism addressing UV exposure does need to be included in the risk assessment. The original WDNR/SEH approach may exaggerate the risk from UV-enhanced toxicity to benthic organisms. But, not including it as all as a mechanism is also not correct. A rationale approach to this issue can be developed between EPA, the Chippewa Nation, WDNR, Xcel, and the Trustees. A key piece of information in this regard is the acual UV irradiance at the sediment surface within the areas we are interested in. This can be measured directly (preferable) or estimated. It does not appear that it has ever actually been measured.

Xcel's rationale for not performing larval fish bioassays is not accepted. There are procedures for fish larvae testing. Again, uncertainty is not an acceptable reason for not doing a test, and stipulation of risk is not an acceptable substitute for actual, site-specific data. We must establish what the specific data quality objectives are. What is the purpose the bioassays, UV phototoxicity testing, and fish larvael studies? What do we already know? What about short term toxicity tests (e.g., 10 day Chironomid mortality test). That is, the assessment endpoints previously defined are overly general and doing a better job at defining them can help sort out exactly what samples and analyses are needed. A simple sediment sampling design may be adequate: A few samples with a tiered testing (5 day acute screening followed by the 10 day definitive tests and using a blending with a local reference sediment).

The sediments have very high levels of PAHs, it appears that organisms cannot live in this material and it therefore has affects on the ecosystem. Cleanup is going to require removal of visible contamination or complete capping to keep all that material from getting out.

Xcel argues against *C. tentans* bioassays under UV light because UV light is still an area of active research, it is nearly impossible to replicate environmental conditions in the lab, and benthic receptors at the site are primarily infauna and have little exposure to UV light. With regards to this argument, it should be noted that: 1. all science is in active research, not just UV light research, the relevant UV wavelengths can be reproduced in the lab, and the exposure can be be performed in the presence of sediment. It is true that physical shading by sediment particles will decrease UV exposure, but, we do not believe it will eliminate it. If the infaunal organisms are exposed to sediment, then removed from sediment and exposed to UV light in that absence of sediment, then that is artificially increasing their UV dose. But if one simply conducts the sediment exposures under an environmentally relevant UV exposure (which can be determined by measurement or calculation), then the burrowing habits of the organisms will be incorporated into the exposure results. This type of testing has been done both in situ and in the lab by EPA staff at the Duluth laboratory.

In general, inability to replicate field conditions in the lab is insufficient to dismiss any type of testing out of hand; and stipulations are no substitute for actual field data. Stipulations of risk do not establish a current level of risk, which would allow for long-term monitoring and helping to determine to what level clean-ups must be done. This is applicable to all field tests that Xcel is arguing against.

The document needs to clearly explain if the results of the 2001 *Hyalella azteca* sediment toxicity bioassays will be included. If the results are included, then the objection to the multi-species analysis is moot, and only toxicity testing on *Chironomus tentans* needs to be done. If the results are not included, then EPA requires additional testing with both *H. azteca* and *C. tentans*.

Section 4.2.2.3.3, Page 4-23: Provide the number of replicate samples for the *C. tentans* bioassay.

Section 4.2.2.3.4, Page 4-23: Revise as follows:
The sediment chemistry characterization will consist of collecting bulk sediment for chemical analysis at stations where sediment toxicity and benthic macroinvertebrate samples are collected. Bulk sediment samples from all of the replicate samples will be analyzed for sediment chemistry. One replicate from each station will be evaluated for PAH forensics. One sample from each station will be analyzed for pore water chemistry (SOP 300).

Section 4.2.2.3.4.1, Page 4-24: It is recommended that the sediments be tested for appropriate physical parameters such as grain size (see comment on Section 4.2.2.3.3, above).

Is the VOC, SVOC and metal analyses in addition to the PAH analyses?

Revise the last sentence to read: "In addition AVS:SEM analysis will be conducted on one of the replicates from each station."

Section 4.2.2.4.1, Page 4-24: The sections of the SEH draft work plan that Xcel agrees with and wants to include in its work plan should be specifically incorporated into this document, not simply referenced. This will ensure that the work plan is complete, clear, and all requirements are fulfilled in the field and laboratory. In addition, the rationale for the sampling needs to be in conformance with the objectives of this study and therefore, the rationale for the sampling needs to be clearly specified.

Are there other contaminated sites in the area that would confound the sampling results? Do any sensitive species use the bay for spawning and/or nursery grounds?

First, outline the purpose of this data collection. Why are we collecting fish tissue? Are there species of fish known to occupy the inlet that are bottom feeders that are consumed by other fish and human beings? What species do the subsistence anglers eat? What are these species? This fish tissue sampling effort needs to be related to a conceptual site model and the data objectives. Therefore, first specify the fish species that are known to occupy Chequamegon Bay, have been documented in the inlet, and are benthic feeders. Which of these are commonly consumed by human beings and other mammals? Sedentary top-order predators such as yellow perch, northern pike, small-mouth bass and walleye would likely be the most appropriate species. If this inlet doesn't have any fish communities, what communities might be there if there was no contamination (e.g., identify a reference area and document the species that could be living there, but aren't, because of the contamination).

One target species of concern by anglers in the area is the smelt, (*Osmerus mordax)*, which has been sampled already for this project. Therefore, the smelt sampling need not be addressed any further in this document, except to state that it was sampled during the 2004 seasonal run and the data will be incorporated into the write-up of the RI Report. Smelt sampling results will NOT be incorporated into the human health risk assessment as it wasn't sampled for use in that analysis.

Smelt was sampled to address citizen requests to WDNR to document the fact that smelt are not affected by this site and to document that fact due to their **migratory nature and the fact that they are not benthic feeders.** If the sampling results show something different, then, we will need to reexamine our conceptual site model.

For any fish sampling effort, please note that all fish samples will be examined and data recorded on a field record form as outlined in the EPA *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Vol. 1* (EPA 2000). At a minimum, the recorded data will include length, weight, sex, and any morphological abnormalities including tumors. It is recommended that collection permits and coordination with the U.S. Fish and Wildlife service be pre-arranged, in order to provide for flexibility of sampling in response to seasonal fish migration.

Fish collection would occur during the normal fishing season for Lake Superior Waters as described in the current Wisconsin Fishing Regulations. Many species' fishing seasons are open all year, including Northern Pike, Yellow Perch, Walleye and Whitefish. Trout open season is generally limited to December through September. Ideally, the sampling period should target the latter part of the summer into early fall (when fish lipid levels are at their peak) and should avoid the spawning time of the above-listed species, including the 1 month before and 1 month after spawning. The spawning period varies from year to year; therefore the sampling period will be determined by local WDNR Fisheries staff. It is anticipated that the fish sampling period would occur during the months of August, September or October. All fish samples should be collected during a two-week time period. Fish samples would be collected using electrofishing . Sixteen samples (8 skin-on filets and 8 whole fish) would be collected of each fish species. Each fish sample will be weighed prior to packing to ensure that the total sample weight exceeds the 200-gram minimum weight. The individual samples will be vacuum packed and placed on dry ice for shipment to the laboratory. Samples will be shipped overnight to the laboratory. Laboratory processing shall be in accordance with EPA Fish Sampling Guidance (EPA 2000).

Fish samples would also be collected from a reference area(s). The near shore area between Fish and Terwilleger Creeks is an acceptable reference area. Eight samples each will be collected from the reference locations.

In summary, delete the type of text in the current section, referring to another work plan and discussing Xcel's beliefs about the data. This section should simply provide the objectives of fish tissue sampling, and the sampling strategy – and may reference to details in the Field Sampling Plan.

Also, the locations for sampling will be plotted out on a map – though flexibility can be written into the Field Sampling Plan.

Further, Xcel's **rationale** for not performing larval fish bioassays is not accepted. There are procedures for fish larvae testing; **uncertainty** is not an acceptable reason for not doing a test, and stipulation of risk is not an acceptable substitute for actual, site-specific data. Fish larvae testing may be necessary to address the uncertainties in the conceptual site model (what we know about contamination in the sediment and how it affects the ecosystem). Are fish larvae being affected by the Site? How are fish populations impacted if there are impacts to fish larvae? Are there no fish larvae living in this area because of the high levels of PAHs? If there are fish larvae, do they exhibit any impacts? Are any adult fish exhibiting any deformities which may be caused by Site exposure during their juvenile stage? Are any fish populations affected?

With specific regardsto fish, the Chippewa Nation is primarily concerned with sedentary top-order predators such as: yellow perch, northern pike, small-mouth bass, and walleye.

Section 4.2.2.4.2, Page 4-25: Delete the text in this section. The rationale provided for not performing bioaccumulation monitoring with mussels under existing site conditions does not seem to make sense. First, the purpose of using mussels is to ascertain whether or not these filter feeders pull in contaminants from surface water and/or sediment under EXISTING CONDITIONS. What heavily impacted parts of the bay is Xcel referring to? It is not a definite eventuality that such areas will be remediated. The purpose of this study is to ascertain whether remediation is necessary and if so, what remedy to select (pursuant to CERCLA as amended by SARA). Determining the impacts to benthic organisms is an important part of such a study. Using caged mussels can ascertain whether or not benthic invertebrates and filter feeders do get contaminated from the surface water pathway and the sediment pathway.

Since bivalves are stated to be a receptor of concern at this site (Section 4.2.2.6.4) and because PAHs are known to be toxic to bivalves, potential impacts of contaminants on these organisms need to be ascertained. Further, the data collected from the caged mussels can facilitate the development of remediation **objectives** for the bay. The text provided in this section contains both incorrect and self-contradictory information as follows:

The statement that the only wildlife receptors that would feed on mussels would be diving ducks is incorrect. Studies indicate that raccoons also feed on mussels (EPA, 1993). In addition, the text implies that fish might also prey on mussels. Modeling is a tool that can be helpful; but, it isn't recommended in lieu of actual site-specific information. In this case, it doesn't make sense to model potential food web exposure using literature-based biota because it is possible to sample actual benthic organisms.

In reference to the caged mussel studies, it is not appropriate to rule out this type of study simply because the type of mussels used are not endemic. While the use of surrogate species does confer a degree of uncertainty, it is not uncommon to do so. Caged mussel studies in fact do provide useful baseline data for, among other reasons, monitoring purposes.

It may not be necessary to use caged mussels if actual endemic benthic invertebrates are utilized, especially if the invertebrates are used, as recommended, for toxicity/tissue residue and bioaccumulation studies and for baseline/monitoring purposes. However, the current text does not indicate any procedures for the collection and analysis of endemic mollusk tissues in lieu of caged mussel studies. As previously stated, caged mussel studies may be appropriate however, because several species of mussels have been identified as inhabiting the Bay.

Finally, since monitored natural recovery is being considered for this site, bioaccumulation monitoring would be extremely helpful data. Bioaccumulation testing using *Lumbriculus variegates* is recommended in *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition (*EPA 600/R-99/064, March 2000). The testing scheme used in evaluating risk and in developing remediation objectives should also serve as a baseline for the monitoring needed to demonstrate natural recovery. The use of caged bivalves would reduce, and possibly eliminate the **uncertainty** (due to a lack of in situ toxicity measures).

Please also note that for all TRVs, NOAEL/NOEC and LOAEL/LOEC values for all biota and media that will be tested, and all of the the respective values and literature sources shall be provided.

<u>Section 4.2.2.5.1, 4.2.2.5.2, 4.2.2.5.2.1 pages 4-26 – 4-28:</u> As with the rest of Section 4, this discussion needs to be entirely re-worked. The "screening" work described in the current text should have been performed already ---- as part of putting together this work plan and putting together the conceptual site model. Published information on the hydrology of Chequamegon Bay, sediment transport, etc. should have been incorporated into the site background section. EPA had expected Xcel to put all of the existing data and available published data into this effort.

It is unlikely that there is NO potential for sediment transport due to wind and man-made activities, as suggested in the text. The presence of large pieces of waterlogged wood along the shore, the deposits of wood chips and sediment, turbidity of the water, and the formation of oil slicks observed by EPA during its site visits already demonstrates that there is transport of sediment and debris at the Site. The questions to be addressed in this work plan include: How much contaminated sediment being transported out of the inlet? Are contaminants from the source areas traveling through the groundwater and upwelling into the bay in areas other than the one inlet? Where is contaminated sediment migrating to? If so, how much? Is the contaminated sediment remaining within the inlet getting buried and covered by clean sediment?

If so, under what conditions? What wave/wind velocities would cause the erosion of buried material?

Comparing the last round of surface sediment data to previous surface sediment data may answer some of these questions. If the levels are about the same, does this mean the sediment isn't getting buried? How does the woody debris affect transport?

Sediment stability "modeling" is not necessarily the preferred approach when actual data can be easily obtained. First, any bathymetric survey information on the area should be obtained from published literature (information may be available from the marina, the Corps of Engineers, or the local colleges, for example). A bathymetric survey should also be performed in the area between the jetties as well as in and around the marina and in and around the swimming beach. NOAA, Army Corps of Engineers, the Coast Guard, WDNR, GLNPO, and others may have both bathymetric data and hydrologic data for this area. Has sediment core data been evaluated to determine whether or not the sediment burial in various areas has been constant (steady-state) hrough time (i.e., are there undisturbed cores that show constant burial – or do the cores show unconformities, biological activity, etc.)?

All of the background information discussed in the text for evaluating wave conditions, natural and man-made, are appropriate – but this should have already been done as part of the existing information – background analysis of the site – and in putting together the conceptual site model. Such information can be used as "inputs" to a model but the model will only be as good as the data that is used and actual site-specific data should be used as model input parameters. The literature search information is good for conceptualizing the system – but non-site specific data is not appropriate to use as input parameters in a model when site-specific data can easily be obtained (if a computer model is used at all). It is simply better to get real data and information to describe what is going on, rather than to "model" it. A model may be appropriate here, as well, for a different purpose: to be used as a tool to derive answers to questions where we cannot collect data; such as, what happens to the sediment in the inlet when there is a 100-year or 1000-year storm?

In addition it is noted that the White River flows into Chequamegon Bay. White River, according to information provided by the Chippewa Nation, does not flow into Chequamegon Bay.

Section 4.2.2.5.2.2 Page 4-29: As in the other sections, this section and its related sections, needs to be completely re-worked. The focus shouldn't be on the model, that may or may not be used as a tool, but on collecting actual data. EPA agrees that the sediment **characteristics** are predominant in defining stability and erosion of the sediments. Most sediment transport models are not yet sophisticated enough to simulate erosion and deposition of cohesive sediments. Existing data collected by WDNR should have been used to make some assumptions about the nearshore sediments already. Again, what does bathymetry tell us? What do previous cores tell us? What does the chemistry indicate? How does the shoreline look? Does it appear to have been subject to high energy events with a poorly sorted mix of substrate (e.g., large wood logs, sand, silt, cobbles), or is it a uniform with small grain sizes?

Please note the following:

Cohesive sediments are more aptly defined by behavior than size. That is, cohesive sediments are those in which the attractive forces, predominantly electrochemical, between sediment grains, are stronger than the force of gravity drawing each to the bed. Individual grains are small to minimize mass and gravitational attraction, and are generally taken to be in the silt to clay size range. The strength of the cohesive bond is a function of the grain mineralogy and water chemistry, particularly salinity. A coarse silt behaves like noncohesive fine sand in fresh water, but is cohesive under salt water conditions. Grain size and shape do affect "cohesiveness." As grain size decreases, so does the size of the interstitial pore space while drainage path length increases. The small pores result in greater resistance to flow, exacerbating the effects of the long drainage path. Clay minerals tend to form flake-shaped platelets, rather than spherical particles. These platelets deposit with the smallest dimension vertical, further reducing pores and increasing vertical drainage paths. The principal indicator of "cohesive sediment behavior" is a critical shear for erosion of bed sediment, which is significantly greater than the critical shear for deposition. That is, once the sediment has been deposited on the bed, the cohesive bond with other bed particles makes it more difficult to remove, than particle mass alone would suggest.

Cohesive sediments may exist in different states along a shoreline: consolidated (compressed beneath an overburden); suspension (individuals grains or flocs dispersed in the water column and transported with the water); fluid mud (a static or moving intermediate state between suspension and deposition, analogous to bed-load transport of noncohesive sand, that can move in the direction of flow supported by the bed --- fluid mud is the result of excess pore pressure; the whole mass of sediment and trapped water behaves like a uniform dense viscous fluid); mud (unconsolidated cohesive sediment recently deposited --- recently meaning a few hours to a few years). Of important note is that consolidated shores consist of consolidated or partially consolidate cohesive sediments which are usually covered by a thin veneer of sand and gravel, sometimes forming a beach at the shore. The sand veneer often disguises the underlying cohesive substratum. It is extremely important to be aware of what this nearshore environment is. What would happen to it if it were dredged? What would happen to it if it were artificially capped (e.g., what would happen to the pore pressures and how would that affect the engineering)?

Greater detail needs to be provided in the work plan to explain: what we already know about sediment characteristics from previous analysis; what previous borings have revealed to us about the shoreline (is it a cohesive shoreline? What are the pore pressures, etc.); what are the characteristics of the sediments are (the mineralogy, grain size, clay content, sorting, porosity, permeability, etc.); and what our conceptual site model is. This plan should have already established that with the existing data. What does that information tell us about the potential for erosion and stability? Is this a cohesive shoreline with a veneer of sand and wood debris (which is also coated with PAHs)? What do the subsurface sediments look like? Are the interstitial pore spaces filled with water or NAPL or a mixture?

Another important consideration is the fact that once cohesive sediments are eroded away (and the bonds between the clay particles are destroyed), it cannot be reconstituted in the littoral zone. The eroded fines (silt and clay) will carried offshore, and deposited in deep water. That fact has major ramifications for the transport of contaminants that had been adsorbed to the clay and silt particles.

Why were 5 cores determined to be representative of the nearshore sediments? Why not 3 or 25 or any number? The number of cores to be taken should provide us with data that gives us a high level of certainty.

SOP140 is inadequate and too unspecific, even for **soil** sampling protocols (which it seems to only be written for). SOP 140 refers **only to land based soil sampling** via a split spoon sampler or a geoprobe drill rig. SOP 140 has absolutely nothing to do with sediment sampling (beneath water) for the purpose of analyzing erosion and stability. Examples of SOPs with the sufficient details for subaqueous studies can be viewed at: http://www.epa.gov/hudson/qapp.htm. Also included on that link are EPA SOPs for: sediment core collection; bathymetric survey, sub-bottom acoustic and electromagnetic surveying equipment, sediment probing, atterberg limit, specific gravity, bulk density, total organic carbon, USCS classification, side scan survey procedures, and core processing. Adaptation and use of these SOPs, or SOPs of equal quality are highly recommended for this study.

Section 4.2.2.4.2.3, Page 4-30 - 4-31: The same comments apply to this section. Actual data will be collected. A model to provide answers to questions such as changes in hydrologic conditions may be applied, using this data. It is important to note that certain data can be collected to answer questions directly such as – does the sediment erode, are there areas that seem to be depositional over the long-term (geologic time), are the natural sediments cohesive (high clay and silt content with the right mineralogy? Are the sediments cohesive because of the contaminants? How do the contaminants therefore effect the transport of the sediment? It is also important, when discussing the potential use of models, to ensure that data is collected to support a model as well – certain types of models require certain types of data. For example:

Hydrologic (watershed) models can be used for simulating flood information (basin runoff to determine flood hydrographs). Data needed include: detailed watershed maps, land use data, weather data, stream gage data, cross sections of bed slope and flood plain features.

Hydraulic (Hydrodynamic) models simulate the hydraulics (flows, stages, velocities) of a lake (or river) in 1, 2, or 3-D steady or unsteady state. Data needed includes: stream data related to cross sections, bed slopes, flood hydrographs, local inflows and municipal and industrial withdrawals.

Sediment Transport models simulate the processes of erosion and deposition of non-cohesive or cohesive (some models may be adequate), in channels and reservoirs. Information from sediment surveys, information on bed load and suspended load, laboratory data related to critical sheer stress, channel geometry, flood hydrographs, velocities, stages.

Contaminant Transport Models simulate the processes of chemical dispersion; simulating adsorption, desorption, decay, erosion, deposition, transportation of contaminated bottom and suspended sediments. Data needed include: chemistry, dispersivity coefficients, sediment adsorption coefficients, and output from a hydraulic model in the form of a velocity field.

It is not clear from the written text what models are being proposed, how they will be related, how site-specific data will be used to calibrate and verify them, and exactly what they are being used for. As previously stated, the most important aspect should have been to compile all of the preexisting data and define what we know and don't know about this sediment.

Comparing expected sheer stresses using the empiracle charts --- what is the purpose? Actual data shall be collected. It is of great importance to determine whether or not the sediment is cohesive or not or something in between, and how the sediment is transported. Guessing what it is and comparing those estimates to a chart of critical shear stress is only helping in setting up the initial conceptual site model and helping us predict what we may be dealing with. This should have already been accomplished with the existing data set.

Section 4.2.2.5.2.4, Page 4-31: Theoretical boat propeller wash scour analysis --- what is the point ? It is already a known fact that boat propellers cause slicks and disturb the bed load enough to release PAHs. The text states that there is a "potential" for prop wash scour. Again, we already know this to be a fact, which is why WDNR has made the inlet off-limits to boat traffic. It is possible to take actual measurements of the scour ---- certainly such measurements can be used to define the critical shear stress of the sediments, which could then be used to help make estimates of what happens under various wave velocity scenarios.

Section 4.2.2.5.3, Page 4-31 - 4-34: It appears that Xcel has attempted to provide a conceptual site model based on existing data in this section. Such a discussion would have been preferable at the beginning. The information provided should incorporate facts to back it up. How do we know that contamination is mainly confined to a sediment layer extending a few hundred feet from the shoreline? Is this the extent of the cohesive sediment layer? Is this possibly just a veneer of wood chips that is hiding the bulk of the contaminants? Where did the wood chips come from? Are they from lumber mills as simply suggested in some previous documents or are they "box waste" also known as "purifier waste."

Provide the data to back up the information. For example, it should instead say something like: "Figure 1 shows the surface sediment sampling locations – samples were taken wherever there was visual contamination. The sediments are visually contaminated to x distance from the shore. Later, samples were taken beyond the visual contaminant boundary and lower levels were found. It appears to grade off but this needs to be confirmed." With regards to the thickness or depth of contamination, back this up with the facts – with the actual data that we have now, and what data we still need to get.

The preliminary models to set up what we think is happening, is exactly what we wanted to be done, for the entire site. Use the existing data, come up with conceptual site models to explain what we see, define what we don't know and how to verify our hypotheses.

How do we know that the much of the existing shoreline and some of the marina structures were created by back-filling soil in to the bay? Why would the bluff material be likely backfill material? How long has the railroad been there? Why would the people in the buildings on the bluff permit the structural stability to be degraded by allowing the bluff material to be removed? Why is the shape of the depositional areas consistent with the view provided in the text? Have aerial photographs been obtained? Can we see the history of the shoreline in such aerial photographs? Wouldn't backfill also contain coal tar? What about the outfalls from the MGP and the 12" clay pipe? Couldn't these have directed discharges in to the bay? Why isn't this mentioned as a possibility?

The stated theory that the bulk of contamination happened to just settle in this inlet from other areas due to waves and currents and didn't come from the nearby sources (MGP, WWTP, landfill material), seems highly unlikely. Though, we do agree that the jetties may help to trap sediment, today, depending upon wave and wind energy. But, it is unclear if the sediment remains or continues to be transported out of the inlet.

Actual data can answer this question. Actual information is likely already available through NOAA, WDNR, and GLNPO concerning the currents and transport in Chequamegon Bay. And, if the contaminants are to have come from someone else, where would that somewhere else be? What are other potential source areas in Chequamegon Bay?

<u>Section 4.2.2.5.3.1, page 4-34:</u> This work should have been conducted as part of putting this work plan together.

Section 4.2.2.5.3.2, page 4-34 – 4-35: As mentioned above, this work should have already been factored into this work plan --- had a conceptual site model been prepared as was expected --- that is why EPA instructed Xcel to put together the existing site information and simply build upon what we already know. Depending upon the cores already collected, we may need to collect additional information on grain size, atteberg limits, TOC, etc. and cohesive or non-cohesive properties can be defined, critical shear stress can be defined, and we can understand sediment and contaminant transport. Right now, there is a significant data set and it wasn't appropriately factored into the writing of this work plan.

Section 4.2.2.5.3.3, page 4-35: All data will be written up into an RI Report. There will not be a "screening" level phase and "screening level report." Xcel will have to revise this work plan and address the data we already have (in the conceptual site model), and this work plan will then clearly identify the data gaps, the data quality objectives, and the data gathering field work. That data will be collected and put together with the previously collected data to refine the conceptual site model (that should have already been put together), refine the existing human health and ecological risk assessments, and then proceed to the Feasibility Study. The "Qualitative Report" mentioned in this section, should have been Section 1 of this Work Plan. An executive summary version of this was the Technical Letter Report – or Xcel's first attempt at putting all the information together. It seemed to be adequate as we scoped out the writing of this work plan. However, this work plan does not reflect an adequate assessment and review of all the data and serve as a starting point to fill in the data gaps.

Section 4.2.2.5.4, page 4-35: Refer to comment above. Actual data will be collected to ascertain the characteristics of the sediment as part of this work plan. We already know, from existing data, that it is likely a mixture of cohesive and non-cohesive materials, but, the details need to be determined. We are not going to go through a "screening" phase and then set up another work plan.

Section 4.2.2.5.5, page 4-35- 4-36: A model will NOT be used estimate sediment deposition and erosion in and around the site. Real data will be used: bathymetry, cores, etc. A model may be used to help predict what can happen in Chequamegon Bay under various high energy and low energy scenarios through time. In any case, a model, to correctly simulate conditions, needs input parameters from real site data. This real site data gives us the information we need. The model can be a tool to simulate what can happen to the sediment in the future. Or, perhaps what happened to it in the past. But, it can only be useful if it is accurate, and accuracy is only certain if we use site specific data.

Section 4.2.2.6, pages 4-37 – 4-45: Delete. This section on the Baseline Ecological Risk Assessment should be in the new Section 3.4 of the revised Work Plan. Refer to page 26 of these comments. The data quality objectives for the risk assessment work needs to be clearly stated. The type of text provided in the document is not helpful and is duplicative of other sections in the work plan. Again, the nature and extent of contamination has not been defined. With regards to other factors of ecological concern, these factors will be incorporated into the analysis by virtue of the fact that appropriate reference areas will be selected and used in the data collection protocol. Other factors besides MGP contamination (other contaminants from other sources) and the factors such as wood chips will also be considered.

With regards to the risk assessment work, please also note that an extremely useful reference containing up-to-date guidance and screening levels is:

http://risk.lsd.ornl.gov/rap_hp.shtml and this reference should be incorporated into the Work Plan.

The tools and models on the aforementioned site can be used to assist in the Risk Assessment work. EPA has also developed ecological soil screening levels (Eco SSLs), refer to:

http://www.epa.gov/ecotox/ecossl/ and OSWER Directive 92857-55, November 2003.

In addition, the Oak Ridge National Laboratory (ORNL) Risk Assessment Information System (RAIS) database should also be consulted for toxicity data for surface water, sediment, terrestrial wildlife, vegetation, and soil invertebrates. Refer to: http://risk.lsd.ornl.gov/rap_hp.shtml for all of the specific details.

In addition to the conceptual site model based on the existing data, identification of data needs and data quality objectives, the work plan should also have a section with identification of preliminary remedial action objectives and potential remedial alternatives. This would be appropriately placed in the new Section 3.5. Please see comments on page 28. The text on pages 4-39 through 4-40 are acceptable so long as it is clear and qualified that these are preliminary and proposed.

Additional commentary on subsections of 4.2.2.6 (for your information):

Section 4.2.2.6.1, Page 4-37: EPA agrees that the risk assessment work will be UPDATED to reflect the additional data collected as part of this work plan. The preexisting data is the information that is used to derive the conceptual site model. The WDNR risk assessment already completed will simply be revised and updated – not scrapped. Issues with previous data can be flagged and questionable data may be used in a qualitative way, if appropriate.

As this section contains text which discusses the baseline problem formulation, the following information should be considered by Xcel as it prepares its revision:

The SEH ecological risk assessment work should be considered to have already gone through the three primary phases: problem formulation, analysis, and risk characterization. The scoping, background, and data evaluation part of this Work Plan should have already updated the problem formulation (based on any new information since 1998, the data gap identification by CSTAG, etc.).

Section 4.2.2.6.1.1, Page 4-37: This section on "nature and extent of contamination" seems misplaced. This section was about the ecological risk assessment. What specifically is known about site contamination as it relates to a risk assessment? What does the current conceptual site model tell us? There is contamination in ground water, surface water, soil, and sediment. We do not know the contamination extent in any of these media. With regards to ecological risk, the ground water contamination is not of concern except that ground water contamination may be migrating into the surface water and at its point of discharge could be affecting some ecological community. What does contamination in the surface water tell us with regards to the ecosystem? What organisms do we think might be at risk? The same question applies to the sediment. What did the SEH ecological risk assessment determine? How do the identified data gaps impact the SEH ecological risk assessment findings? Will additional data change the results? Are there other organisms that haven't been considered that need investigation? What is missing? Etc.

Please also note that the text should not refer to the nature and extent of contamination from "COCs." It is the nature and extent of contamination from the SITE. It is appropriate to choose chemicals of concern from the site to focus future sampling so that the entire suite of chemicals not be sampled in the future. Though, the entire suite can be sampled if there is a belief that there might be other chemicals not from this Site impacting the areas we are investigating.

Section 4.2.2.6.1.1.1, Page 4-37: The title reads "Constituents of Concern." The proper terminology is "Contaminants of Concern." We agree that the WDNR identified chemicals of concern should be our presumptive list (unless some information or data collected as part of this work plan, or revealed by addressing the data gaps and checking through historical information reveals any other chemicals to consider.

Section 4.2.2.6.1.1.2, Page 4-38: This text is unnecessary. The entire RI, not just the ecological risk assessment, will be taking into account contaminants from all sources that are identified. The MGP is one source. As the data gaps are filled, we may find evidence for other contaminant sources such as hazardous substances that were landfilled beneath Kreher Park or the land between the upper bluff and the shoreline, or hazardous substances used or disposed of by other entities occupying the lake front.

Section 4.2.2.6.1.2, Page 4-39: Sediments are not the only pathway of concern at this site. The references to only surface sediment need to be deleted – and replaced by the term "sediment." The suggested risk management goals are also too limited. Surface water, groundwater, soil, and sediment may all be complete pathways to humans and other organisms. Further surface sediments are not the only issue. Buried sediments may be a risk to burrowing organisms. Also, we still do not know what "buried" sediments mean here. The entire inlet may be in constant flux with burial and erosion on-going at different times, in different places, and changing depending upon seasonal conditions. There may be pore pressures which cause sediment movement.

In the bullet section, delete the word "surface" in front of the word "sediment." All sediment, not just surface and subsurface would need to be remediated to allow a diverse self-sustaining benthic macroinvertebrate community. Also, delete "to the extent that it will jeopardize the sustainability of these species' populations." With regards to ensuring that contaminated buried sediments are not a risk, we need to ascertain information on burrowing organisms, as well as the physical and chemical transport mechanisms mentioned. It does not appear that the current work plan addresses these.

Delete the last paragraph of this section.

With regards to ecological risk assessments, these following six principles are our guide to risk management decisions:

1. Superfund's goal is to reduce ecological risks to levels that will result in the recovery and maintenance of healthy local populations and communities of biota. With that in mind, assessment endpoints and measures should be selected that: are ecologically relevant to the site; and include species that are exposed to and sensitive to site-related contaminants.

2. It is Superfund's goal that our response actions will not only achieve levels that are protective, but will also minimize the residual ecological risks at sites. Due to factors such as technical implementability and response costs at some sites, however, EPA recognizes that its response action(s) may not lead to complete recovery of the ecosystem and that additional restoration activities by the Natural Resource Trustees may be needed to bring natural resources back to their baseline condition within an acceptable time frame. It is important, however, that EPA and the Trustees coordinate both of the EPA investigations of risk and the trustee investigations of resource injuries. The Trustees were given the opportunity to review this work plan and have given EPA comments that have been incorporated into these comments.

3. Site specific data should be collected and used, wherever practicable, to determine whether or not site releases present unacceptable risks and to develop quantitative cleanup levels that are

protective.

4. When evaluating ecological risks and the potential for response alternatives to achieve acceptable levels of protection, Superfund risk managers will characterize site risks in terms of: magnitude (the degree of the observed or predicted responses of receptors to the range of contaminant levels); severity (how many and to what extent the receptors may be affected); distribution (areal extent and duration over which the effects may occur); and the potential for recovery of the affected receptors.

5. Superfund's goal is to eliminate unacceptable ecological risks due to any release or threatened release. Contaminated media that are expected to constrain the ability of local populations and/or communities of plants and animals to recover and maintain themselves in a healthy state at or near the site (e.g., contamination that significantly reduces diversity, increases mortality, or diminishes reproductive capacity) should be remediated to acceptable levels.

This Work Plan should outline these questions and answers (from the SEH work already completed and suggestions for how that information might be revised as part of this work). That is, what are the ecological receptors that should be protected here? Do we already know if there is an unacceptable ecological risk at the site? That is, are the ecological impacts apparent because there is no vegetation and no benthic organisms in the sediment, for example? Are the only organisms present the ones that thrive in hazardous substances? What does the existing data set tell us? How does the Site data compare to similar habitat in uncontaminated areas?

Section 4.2.2.6.1.3, Page 4-40: Revise the receptors as follows:

Survival, growth, and reproduction of benthic invertebrate communities at the Site;
Structure of microbial community at the Site;
Survival, growth, and reproduction of fish communities at the Site;
Survival, growth, and reproduction of aquatic-dependent wildlife (e.g., birds, mammals, reptiles, and amphibians) in habitats bordering the Site.

The "special status species" should be identified up front. List any endangered or threatened species or species of special concern. Refer to comments on Section 4.2.2.6.4, below.

Section 4.2.2.6.2, Page 4-40: Delete. If contamination exists beyond the boundaries currently identified, the site boundary changes. Contamination is the extent of the Site. If certain organisms spend a certain amount of time within the Site, and then travel outside of the Site, then the effects outside of the site need to be considered. For example, if there is a sedentary species of fish that spends part of its day within the inlet, and then at night, travels out to another area, then it can be consumed by another species that is not found in the inlet. In addition, the fact that a species that spends only part of its time or life-cycle within the contaminated zone is important in the assessment of its risk from the Site.

Section 4.2.2.6.3, Page 4-41: Revise the exposure pathways for birds and mammals to read:

"Ingestion and direct contact with..."

Revise "aquatic" invertebrate to read: "Benthic invertebrate" and revise the pathway to read:

"ingestion and direct contact with sediment, pore water, and surface water and ingestion of food."

Revise the plant pathway to read: "root uptake and direct contact with sediment, pore water, and surface water, and..."

Delete the last paragraph on that page, as well as the chart concerning what exposure pathways will NOT be quantitatively evaluated. The rationales provided are not supported and may be incorrect. This work plan should identify all of the missing data gaps, such as, for example, microbial processes as mentioned in the chart. It may in fact be important to compare microbial processes in the highly contaminated portions to a reference area. Further, the assumption that fish tissue transfer of these chemicals is sufficient to account for other invertebrates is not verified. For example, worms and fish process/metabolize chemicals differently. Further, how can it be assumed that the volatilization of the chemicals is too minimal to affect birds and mammals? There is no data provided to back up this statement. Has such sampling ever been conducted? Under some scenarios, the volatilization may be high enough to cause an impact.

Section 4.2.2.6.4, Pages 4-42 - 4-43: Delete current text and revise as follows:

As part of the Baseline Problem Formulation, receptors at risk at the Site are identified from the conceptual site model. From these species, several representative species are selected as receptors of concern (ROCs). These ROCs will be used in the BERA to evaluate the potential for adverse effects and serve as a proxy for other receptors that have similar niches, food habits or feeding behaviors, contaminant exposure and effects mechanisms and sensitivity to contaminants of concern. At this Site, potential ROCs include:

Piscivorous fish – salmonoids, northern pike, walleye, smallmouth bass, lake trout
Insectivorous fish – yellow perch, rock bass, black crappie
Vertebrate omnivores – great blue heron, mallard duck, merlin, gulls, bald eagle, mink
Forage fish – rainbow smelt, lake herring, lake whitefish, Johnny darter, logperch, silver redhorse, spottail shiner, mimic shiner
Invertebrate herbivores – zooplankton, aquatic insects
Invertebrate omnivores – mussels, fingernail claim
Invertebrate detritivores

Section 4.2.2.6.4, Page 4-42: The fish ROCs mentioned on page 4-42 of the work plan are the black bullhead and the walleye. In SOP 230 (Field Sampling Plan), the two higher trophic level fish that will be collected are listed in order of preference. However, the black bullhead is not included in the preferred fish listed in SOP 230. Inconsistencies like these must be corrected. Clearly specify the species to be sampled in the work plan and related field sampling plan and SOPs. Also refer to previous comments on fish tissue sampling.

Section 4.2.2.6.5, Page 4-43 and Exhibit 4-2, Page 4-44: The questions posed in this section and exhibit do not adequately reflect what we already know.

First, benthic community surveys were previously performed. What did those community surveys show? What uncertainty remains from those previous studies in the known area of contamination versus areas that WDNR considered reference areas?

This is what is known, according to the previous work performed, and published literature studies of the chemicals of concern:

The aquatic habitat at the Site is one of relatively shallow water that stratifies thermally from June to September. The immediate project area habitat (the area thus far identified as contaminated) is generally disturbed. No pristine wetland or littoral habitat is present nearshore. However, nearshore and terrestrial areas surrounding the Site are relatively undisturbed and provide a variety of forested, wetland, and littoral habitats. To the west, is the mouth of Fish Creek and a very large wetland complex (Maslowski and Printice City Parks abut this habitat). The Fish Creek backwaters have high value habitat potential for fish spawning. Several other high quality forested creek habitats further west also drain into the bay within two to three miles of the Site. Within the Bad River Indian Reservation, there is significant undisturbed terrestrial and littoral habitat inland and adjacent to Lake Superior, supporting several endangered species. Due to the diversity of habitats surrounding the Site, there is a high potential for use of the Site from mobile species from the pelagic lake zone (e.g., fish, birds, and mammals).

PAHs vary substantially in toxicity and bioaccumulation by aquatic organisms. Uptake of PAHs is highly species specific, being higher in algae, mollusks, and other species that are incapable of metabolizing PAHs. Bioconcentration factors tend to increase as the molecular weight of a PAH species increases. PAHs can be metabolized and transformed by most aquatic organisms except shellfish. In most fish, PAHs are rapidly metabolized, thus concentrations found in tissues are generally low. Invertebrates such as mollusks do not metabolize PAHs as efficiently and can accumulate elevated concentrations of PAHs in tissue. Many benthic invertebrates are deposit feeders that consume a large amount of silt and microdetritus and their uptake of PAHs could be large. *This may constitute a major exposure route for PAHs to fish.*

Several site specific factors could affect the likelihood of exposure of various potential receptors to sediment contaminants adjacent to the Site. On significant factor is the presence of the wood chips. The wood chips could act as a barrier between the contaminants and the receptors. The wood chips could also provide a source of organic carbon to facilitate adsorption of contaminants.

(Note: the wood chips themselves, could potentially be the box or purifier waste from the purifying process. Or, it could simply be wood chips from the lumbering industry, or both. Have the wood chips themselves ever been analyzed for PAHs and cyanide – certainly, closer inspection of the wood chips could help identify their original source).

Exposure pathways include: direct contact with contaminated sediments and/or porewater by benthic invertebrates, direct contact by water column species with impacted surface water or sediments, and ingestion of contaminated food items, water, or sediment by various organisms within the ecosystem.

NOAA guidelines have been established for a total of nine different PAH parameters analyzed during the 1996 sediment investigation. The concentrations of the PAH compounds exceeded ERL values and most ERM values (above which adverse effects almost always may be expected) in samples in which PAHs were deterected. No ERLSs or ERMs were exceeded for metals.

Additional data was collected from the sediments an water column in January and February 1998. A total of 10 sediment samples from the bioactive zone and 12 water column samples were collected. The sediment samples were also observed for the presence, diversity, and concentration of benthic invertebrates.

Preliminary screening against the Ontario and NOAA guidelines indicated that PAHs likely do pose an ecological risk and that metals do not (there were no VOC screening values to compare). Other benchmarks include: Effect Range Median Values (ERMs), Probable Effects Levels, Preliminary Remediation Goals, Apparent Effects Threshold High, Sediment Quality Advisory Levels, and Freshwater Quality Assessment Value-Probably Effect Levels. Sediment chemistry values from the biologically active zone, and deeper sediments reveals that at many stations several chemicals exceed all of the benchmark values. The conclusion reached is that there is a high probability of adverse effects to aquatic life and human health. Validation of chemical laboratory data collected by WDNR showed that most SVOC and VOC data was valid for use in EPA risk assessment work. But analyses for metals and cyanide could not be validated. Additional sediment samples collected in the winter of 2003 were also analyzed for VOCs, SVOCs, various metals, and cyanide. VOC and SVOC concentrations still exceeded guideline values. In addition, copper, lead, mercury, zinc and cyanide results also exceeded SQB guidelines.

In 2003, technical discussions between EPA, WDNR, and Xcel Energy resulted in general agreement among all parties that the previous work has demonstrated a current and potential future risk but the quantification of that risk is still lacking. Questions that need to be answered to quantify risk include:

1. PAH vs. wood chip effects on the ecosystem (and are the wood chips coated with PAH's?);

2. Do the organisms living in the known affected area represent pollution tolerant species and how does this area compare to a clean habitat (no wood chips and no PAHs) and a clean habitat with wood chips (are the wood chips themselves now contaminated from contact with site waste or are the wood chips themselves contaminated from their use as a purifying agent during the gasification process?);

3. How are mature and juvenile fish affected by PAHs and metals and further effects from UV rays (as they affect the toxicity of PAHs). Of note is the fact that studies in the Great Lakes have shown that PAH contamination of sediments has been linked to increased incidence of tumors in certain fish (Baumann, 1987). Comparison of PAH levels associated with tumors in fish at other sites indicates that the concentrations of many PAHs in the bioactive zone at the Site are within the range of maximum concentrations reported to be associated with fish tumors. However, for this Site, it would be highly dependent upon exposure intensity of various fish species to the sediment contamination. Therefore, it is important to document the fish species that spend their time in this nearshore environment. Information already exists on the presence of fish in Ashland Harbor (Pratt, 1998).

Seven species **are more abundant in the shallow-water zones**: smallmouth bass, logperch, mimic shiner, silver redhorse, black bullhead, Johnny darter, and spottail shiner. Nine species are most abundant at the deep-water stations: bloater, longnose sucker, stocked lake trout, lake herring, spoonhead sculpin, lake whitefish, stocked lake trout, lake herring, spoonhead sculpin, lake whitefish, stocked splake, round whitefish, and rainbow smelt.

Black bullhead and longnose sucker are known primarily for bottom feeding and thus are the two most likely to contact sediment contaminants.

Benthic surveys conducted in the early 1970s for the harbor dredging area indicate that oligochaetes are relatively prominent in the summer. A sampling of six points for benthic macroinvertebrates was conducted under ice at the Site in the winter of 1998. Benthic macroinvertebrate taxonomic groups found included mollusks, crustaceans, chironomids, and oligochaetes. Species identified in Winter *1998* included:

<u>Mollusca: fingernail clams, hydrobid snail</u>

These are common members of the benthic community of littoral habitat in lakes.

<u>Crustacea: isopods and amphipods</u>

These crustaceans are generally widely distributed and common in unpolluted clear waters. They were found in high abundance in some areas, which is typical for these taxa.

Chironomids (midge fly larvae)

These were the most diverse group of benthic macroinvertebrates at the Site, comprising 54% of the total individuals. Eleven genera, representing two families, were documented. This diversity is typical of oligotrophic conditions and contrasts to the dominance of the midge Chironomus species that typifies eutrophic and contaminated sites. The most numbers per sample were found at sample site SD-7, a nearly all sand substrate and also the site of some of the highest PAH levels.

Oligochaeta

Five species of oligochaete worms were recorded at the Site, none of which were found to be numerically dominant or of a type associated with degraded conditions. Almost all of them were found at sample point SD-7, which is predominantly sand – though had high levels of PAHs.

Additional Questions:

4. What is the site-specific effect on community structure including benthic organisms, fish, and piscivorous birds and mammals from exposure to offshore contaminants? If population levels of benthic macroinvertebrates in areas where highly contaminated sediments are present in the bioactive zone, then community structure is compromised and higher trophic positions cannot be fully supported without the benthic macroinvertebrates as prey.

5. Does the wood chip layer function as a block to the contaminant exposure pathway from sediment to the water column and/or exposure to bottom-feeding fish? If the depth of wood chip cover changes after high wave energy, then wood chips may not effectively block exposure.

6. Does high level release of sediment contamination to the water column occur during periods of high wave energy?

7. What is the effect of the wood chip layer on limiting exposure to higher trophic positions?

It appears that only the most contaminated areas pose a risk to benthic populations; however, this may be due to the small sample size utilized by WDNR and the use of areas that may still be within the Site boundaries as reference areas. Clearly, the substrate is an important factor. But, it is also important to note that sampling at depth seems to indicate a higher concentration of contaminants at depth (are contaminants migrating from the groundwater into the sediment or was there a major surface runoff discharge sometime in the past that has been buried and not yet disturbed? The very existence of higher contaminant levels and the published literature's quantification of risk from such levels definitely indicates the potential for future risk if no remedial action is taken.

Exhibit 4-2 should be revised to address the questions presented above. Other assessment endpoints to consider include those identified in the Great Lakes Water Quality Agreement of 1978; including controlling sources of contamination into the Great Lakes. Additionally, the Lake Superior Lakewide Management Plan should also be considered. The Clean Water Act provides the overall goals for Lake Superior: fishable, swimmable, and drinkable. In addition, the Great Lakes Water Quality Agreement defines more specific and common goals for the Great Lakes basin. A discharge to the water body is judged against the designated use for the receiving water body and the water quality objectives are: 1. being no less restrictive than the limits on pollutants that protect human health, aquatic life, and wildlife; and 2. encompassing anti-degradation policies. The Lake Superior critical pollutants include: PAHs. The State of Wisconsin sets water quality standards and methods for calculating standards and criteria for Wisconsin surface waters under the Wisconsin Administrative Code (WAC) Chapter Natural Resources (NR) 102. WAC Chapter NR 104 sets uses and designated standards for intrastate and interstate waters and WAC Chapter NR 105 sets surface water quality criteria and secondary values for toxic substances. All surface waters witin the drainage basin of the Great Lakes are to be protected from the impacts of persistent, bioaccumulating toxic substances by avoiding or limitng to the maximum extent practicable increases in those substances. The Chequamegon Bay inlet, which is currently designated as part of the Ashland/NSP Lakefront Site, is on the proposed 2004 Section 303(d) Impaired Waters List.

Section 4.2.2.6.6, page 4-45: The risk characterization, described above, would be appropriate for this section. A summary of what we do know about risks and what data we need to collect to complete our analysis.

Section 4.2.3, page 4-45 through 4-60: Delete.

The review of this Xcel Work Plan included the technical stakeholders: EPA, Chippewa Nation, WDNR, and NOAA. A citizen group that would function as a technical reviewer has not yet been established, though citizens have been notified of the TAG program and during our community interview process, we encouraged citizens to apply for such a grant. We also notified them of an alternative, the Community Advisory Group, which fills a similar role.

Many criticisms of the Superfund community involvement process expressed in the National Research Council Report (NRC), "A Risk-Management Strategy for PCB-Contaminated Sediments" do not reflect today's Superfund program. EPA's community involvement program has been advocating greater involvement by the affected community since at least 1999. Further, the NRC report's graphical representation of community involvement in the Superfund Program is very much abbreviated. The NRC neglected to mention important EPA guidance, written back in 1988 which states:

> Section 117 of CERCLA emphasizes the importance of early, constant, and responsive relations with communities affected by Superfund sites. Community relations is a useful and important aspect of the RI/FS process. Community relations activities serve to keep communities informed of the activities at the site and help the Agency anticipate and respond to community concerns. A community relations plan is developed for a site as the work plan is prepared. Two-way communication with interested members of the community should be maintained throughout the RI. The RPM and Community Relations Coordinator keep local officials and concerned citizens apprised of site activities and of community relation activies...providing information to the community concerning the development and screening of remedial alternatives and btaining feedback on community interests and concerns associated with such alternatives.

In other words, community involvement is extremely important in our work and EPA fully intends to engage this community fully and utilize the lessons learned in Chapter 4 of the NRC report.

While the law does not require draft technical work plans to be distributed, we have a policy of keeping the community informed throughout every stage, holding community involvement sessions thoughout the scoping of the project and implementation of the project.

During the community interview process, EPA was notified by the majority of citizens that they do not want to be "technical" reviewers. They feel that EPA and WDNR are their representatives. That is, the cross section of citizens we interviewed did not want to be the technical decision-makers – they want to ensure that their concerns are taken into consideration as we continue on with this project. That is, citizens do not want to make determinations regarding the technical details of the sampling program; they want to be **INFORMED about** the sampling program and they want to be involved in the remedy selection process.

EPA agrees with Xcel that participation by the community is extremely important and we have already been working towards actively engaging the community. That is why we have tasked WDNR/Sigurd Olsen Institute as the lead for our community involvement program. We have already conducted citizen interviews, including a citizen that also works for Xcel Energy. However, we agree that those citizens that want to participate in a more technical way, should, and we will continue to let citizens know that their input is welcome and that establishing a TAG or CAG is a good way to become involved.

Further, please note that once we, the technical "stakeholders" agree upon the bulk of a work plan, then we will present the plan to the general public with the knowledge that it is a DYNAMIC work plan that we can alter based upon any input we get. We do not plan to notify the public at a later stage, once everything is completed. Again, please also note that the bulk of the criticism regarding community involvement at sites used as case examples in the NRC report does not reflect current protocol at EPA. EPA's Community Outreach Program changed significantly well before the National Research Council Report and this RPM has always ensured participatory community involvement.

The general citizen wants us to explain what we are doing in plain language (not decide what the details are in our sampling plan). Though, often, they have very helpful information (e.g., what fish they eat, what parts of the bay they wade in, what they are concerned about). Once a technical work plan is agreed upon in principle, then we bring it out to the public for further discussion. This RPM has almost twenty years of experience in community involvement. We agree that an involved and participatory community is extremely important, valuable to the project and is the best way to operate. However, we cannot go into the community with incomplete, imprecise documents. We must be able to go to the public with some direction.

As previously stated, the public relies on the technical expertise of the EPA, WDNR, the Chippewa Nation, and Natural Resource Trustee Agencies to oversee work conducted by potentially responsible parties. The general public (including residents, businesses, city government) has been approached, throughout the course of the work previously conducted by WDNR, through the Site's listing process, and during the course of the review of this very document to hear their concerns. This Remedial Project Manager is fully cognizant of the issues of concern to the various stakeholders. The primary citizen and local government concern is: when is this site going to be cleaned up, why do we even have to perform any more studies, and how can it be good for Lake Superior to let PAHs continue to remain in the environment, in an open water system? The City is extremely concerned with the future of this property. The City wants to re-use its WWTP buildings, and utilize the land it owns along the lakeshore for recreational uses, and it wants to expand its marina. This use information must be incorporated into our evaluation.

As previously discussed, the Alternative 2 strategy which is presented within the Work Plan is not appropriate for a work plan. EPA had expected Xcel to submit a separate letter with these other concerns. We very much appreciate the fact that Xcel did include, in the work plan, what it believed to be adequate for completing the work at the Site, but, it is too general and didn't do a good job of clearly defining the conceptual site model based on the existing data set, and clearly identifying the tasks needed to address the data gaps/CSTAG concerns

EPA has been, and will continue to involve stakeholders in this work. EPA has informed the public that Technical Assistance Grant money is available. EPA has informed the Chippewa Nation that additional grant money is also available to ensure their involvement. EPA does not agree that there has been "passive" comment on this site. WDNR held very proactive community involvement sessions with the help of the League of Women Voters and Northland College. Furthermore, we fully intend to continue to hold public information sessions, continue to educate the community on the Site and the technical work we are doing, and we hope that the community chooses to establish, for itself, a Community Advisory Group.

Section 4.2.3.1.1, page 4-46: Delete, see comments above.

Section 4.2.3.1.2, page 4-47: Delete, see comments above. With regards to items 1 through 8, we agree that our next community involvement program (whether it be a meeting, a series of information sessions, etc.) include:

1. The RI/FS process;
2. A summary of what we already know about the site (the Conceptual Site Model) and the questions we are trying to answer;
3. How we are going to answer the questions.

If we describe the questions we need to answer, then we will be talking about what the previous risk assessments did, and did not, answer. We will be talking about what we need to do to quantify the risk(s) and what field work and/or published literature research work needs to be implemented to get at the answers.

Please also note that all data that met EPA data validation requirements can be used in the revised risk assessment and RI Report. Data that could not be validated will not be used, unless we want to consider it in a qualitative way.

Xcel Energy will be writing an RI Report. It will present the facts. It may also present its interpretation of what the data means. EPA, WDNR, the Chippewa Nation, and the Natural Resource Trustees will review the data and the report and interpretations made by Xcel Energy. Through our review, Xcel Energy will get our agreement or disagreement on the data interpretation. Instead of waiting for Xcel's report, we'd prefer to have meetings and discussions throughout the process, as data comes in. It is my intention that we work together, in a proactive way, to perform good science --- and the facts will dictate what the conclusions are. In some cases, the data may leave us with questions that are indeed open to interpretation. EPA will be bringing in its experts to resolve any "interpretative" differences we may have. We also want to provide the community and any other interested parties the data as it is validated. If possible, we'd like to establish a web site where all of the data is uploaded and can be reviewed easily by anyone who is interested.

Section 4.2.3.2, page 4-49 – 4-52: Refer to all of our previous comments on Section 4.0.

Section 4.2.3.2.3, page 4-52: Delete. The sections on 4.2.2 will be revised as discussed in the previous comments.

Section 4.2.3.2.4, pages 4-52 – 4-53: Please note that the Chippewa Nation and NOAA have reviewed the Xcel Work Plan and their comments are reflected in this comment document. If Xcel Energy does not agree with all of our comments (EPA, WDNR, Chippewa Nation, and NOAA), we will most certainly agree to a meeting in which we discuss and come to conclusion on the issues. We will also follow the procedures described in the AOC. EPA will be the final arbiter and the RPM has already tasked numerous technical experts to review the proposed Xcel work, including our Environmental Response Team, Dr. Mark Springer and Dr. Dave Mount from EPA's Duluth Laboratory. Certainly, if there is a contentious issue that our scientists cannot come to a consensus on, I can request support from upper level management to make a determination after a review of the information and facts presented by both sides.

Section 4.2.3.2.4.2, page 4-53: EPA agrees that the study design has everything to do with the questions we are trying to answer, including, whether or not remediation is necessary (what is the risk from the site), and if remediation is necessary, how we arrive at cleanup numbers. EPA does not anticipate a continuance of the problems outlined by Xcel, between itself and WDNR. We expect Xcel to revise this work plan and follow a clear course to figure out where the contamination is, how it affects human health and the environment, quantify risk (unless the risk is so obvious that it needs no quantification; e.g., if nothing can survive in a contaminated area, or only pollution tolerant species can live there), determine alternatives for addressing contamination and what the cleanup numbers would be (are there ARARs, if there aren't ARARs, then what is the best way to determine a site specific cleanup number – e.g., a toxicity test).

EPA must also note that Xcel seems to only address the sediment as an issue. Contaminated groundwater, contaminated soil, and air pathways are also a concern.

Section 4.2.3.3, page 4-54 and 4-55:

The baseline problem formulation process is not going to be started over. It will not happen in two workshops over a four month period. Xcel was already tasked with putting together all of the previous data and coming up with a conceptual site model, and all of the information pertinent to the risk assessment process for all of the contaminated media. This comment response letter represents EPA's, the Chippewa Nation's, WDNR's and NOAA's (on behalf of all Natural Resource Trustee's) response to Xcel's proposal. We expect Xcel to revise the Work Plan by addressing our comments. We recommend a meeting, with all of the reviewers, to help Xcel expedite its revision to the Work Plan, which will reflect the work that will be completed for this project. It is possible that some members of the community may be interested in attending such a technical meeting. However, we do not agree that we should invite some members of the community and not others. On the other hand, we cannot have a productive technical meeting if there are hundreds of people present. As we learned during our community interview process, citizens expect EPA, Chippewa Nation, and WDNR technical staff to be their technical representatives. In the future, we hope that citizens establish a Community Advisory Group and/or apply for a Technical Assistance Grant.

Section 4.2.3.4.2, page 4-55: Delete. Sigurd Olsen is under contract to WDNR. Sigurd Olsen is therefore a subcontractor. Neither EPA nor Xcel can provide direction to Sigurd Olsen. Furthermore, any facilitators need to be neutral. Sigurd Olsen is currently being paid by WDNR. We can find a way to obtain neutral facilitators for any meetings and EPA has an ability to get such facilitators through our Office of Regional Counsel.

Section 4.2.3.4.3., page 4-55: Delete.

Secton 4.2.3.4, pages 4-56 – 4-60: Delete. This type of information does not belong in a work plan, it belongs in a policy letter to EPA from Xcel. With regards to the content, please see our comments below:

EPA does not disagree ---- active participation by all parties helps the entire process. We agree in an active public participation process. We expect to have an active community participation program with active participation by Xcel. We have already provided this Work Plan to the Natural Resource Trustees, and their comments are reflected in this comment letter.

However, EPA does not agree with Xcel's characterization of the "usual CERCLA process." It is my experience that all of the technical stakeholders do work towards reaching consensus. Xcel has been given the opportunity to take a leading and active role in this project. EPA must provide oversight and ensure that the work is being done as if EPA was performing it; it must be performed according to the Agency's requirements. CERCLA is not a "regulatory" program, however, like RCRA or the NPDES, for example. Our requirements are within the statute and the NCP and we have guidance and policy directives to help in the implementation of our program. Policy and guidance allows us flexibility and it is our intention to work with Xcel to ensure that the requirements of the NCP are followed and that we utilize the best science and all of the lessons learned from other similar sites - to get the answers we need in a time efficient and cost efficient manner. Further, Xcel Energy has had the opportunity to actually WRITE the work plan, and provide its own proposals. We hope that our comments are prescriptive and helpful to Xcel in its re-write

Section 4.2.3.4.2, page 4-57 – 4-59: Delete, as above. However please note the following:

EPA feels that this process, in which Xcel was given the task of writing the work plan, provided Xcel with its opportunity to define what work is necessary. Xcel's first draft, upon which these comments are based, needs to be refined and clarified and fully incorporate all of the available data to the extent it can be. We hope that our comments will give Xcel the guidance it needs to revise this work plan and be explicit about the work to be performed. These comments represent the consensus of technical stakeholders, EPA, WDNR, NOAA, and the Chippewa Nation. We are providing detailed commentary to ensure that Xcel understands how to revise the work plan to meet the Agency's requirements.

EPA does not expect research to be conducted unnecessarily. We simply need enough information to figure out (this is a simplistic but accurate representation for this Site):

Where is the contamination?
Where is it coming from / what are all of the sources?
Where is it moving (and if not moving, how did it come to be stable)?
What is it affecting? (How does it affect human health and the environment?) and based on the answers to those questions ----
What do we need to do to address it? (no action, treatment, capping, dredging, in-situ or ex-situ treatment, monitoring, etc.)

If there is no published, peer-reviewed literature, and if there are no Applicable or Relevant and Appropriate standards (codified laws and regulations) to specify a cleanup number, then we must determine an adequate clean up number. As such, we may need to do some common laboratory or field tests to come up with an appropriate clean up number. Field tests can be performed to see if an area can be cleaned up through various techniques and what levels they can achieve. Field or laboratory tests can be performed to ascertain what level of Site contamination does not affect the most sensitive organism that lives or should live in that area.

Previous sections contained a lot of information on the issue concerning PAH toxicity and UV light. Please see our previous comments on UV light. We may agree with the use of a conservative uncertainty factor, but, it isn't clear to us that UV light shouldn't be a consideration in toxicity at this site. We are certainly flexible on the point of UV light and the many issues concerning phototoxicity of PAHs. However, please note that the bulk of the comments on UV light, and the rationale for it, was derived from NOAA, EPA's Duluth Lab, and the Chippewa

Nation. Therefore, before determining that such work is **not** conducted, it is important to discuss this issue directly with the Trustees.

With regards to mussel uptake and a predetermination of remediation, we must point out that we are **not** predetermining a remedy at this time, and mussel studies may or may not be necessary, depending upon what the data objectives are and what we agree we need to collect in data. We could not tell from your work plan text whether or not other mollusks were going to be sampled. If Xcel includes analysis of the fingernail claim or other mollusk that is actually living in the bottom sediments at this Site and in clean reference areas, then, perhaps caged mussel studies are not necessary. However, caged mussel studies are also extremely helpful for providing information on surface water quality through time and provide information on what is actually in the water column. It may also be difficult to obtain an adequate amount of tissue from the fingernail claim for analysis for all of the necessary parameters.

If Xcel has determined, based on the previously existing data set, that mollusks are impacted above the acceptable risk range, from exposure to the contaminated sediment, then, we would evaluate that assessment and likely also conclude that no further testing is necessary to establish whether or not there is a risk to benthic organisms. If we are simply agreeing that remediation is necessary at this point, based on the previously existing data set, then, we only need to determine the extent of contamination (so that we know the areal extent and volume for the remediation scenarios), whether there is still a continuing source into the Bay (because we would have to include a remediation for that continuing source), and we might need some bioassays to determine, for this sediment, what the appropriate cleanup number would be (based on this mix of contaminants in this particular sediment).

Our data program might also need to look at:

What happens if an area is dredged (how does the hydrology change, what affect does that have on the existing park and marina);

Is it possible to effectively cap the area (and can the area be capped and still used for a future marina)?

How do we prevent the continued migration of contaminants into the Bay (if it is continuing to migrate in to the Bay)?

With regards to the benthic community, EPA does not disagree that a benthic community study is a useful line of evidence. With regards to fish tissue studies, EPA does not disagree with Xcel. Any tissue studies should be done on fish or fish larvae which inhabit the subject area. An important note is that the Chippewa Nation has commented that the ecological risk assessment work performed to date was not adequate for evaluating risk, and therefore, agrees with Xcel in those regards. However, they also note that they provided comment and input into the draft work plan prepared by SEH/WDNR and feel that the in situ benthic and larval fish studies presented in that document would satisfy their requirements. In their opinion, what is reflected in that SEH draft work plan is representative of an iterative process that involved all of the stakeholders previously and they would be satisfied with the ecological work outlined in that plan.

Section 4.2.3.4.3, Page 4-59: EPA does not agree with Xcel's interpretation of the CERCLA approach. It is our belief that Xcel Energy does not fully understand the Superfund process. We are not advocating a "linear" approach and we are looking at the site in a holistic sense. We are looking at it with respect to Lake Superior, the Lake Superior watershed, and are hoping to utilize all pre-existing data, and peer-reviewed published literature to the maximum extent possible (e.g., data that is validated, peer-reviewed published literature, etc.). We do need to think about what potential remedial alternatives might be, and how the data from this project can be used by Natural Resource Trustees. The Natural Resource Trustees were first notified about this site back in 2002. The Trustees' comments to EPA on this Work Plan certainly reflect what their data needs would be.

With regards to what the range of remedial alternatives might be, we have broad experience at this point with potential alternatives for ground water, soil, and sediment. There are many other sites that have as a source MGPs, wood-treatment, PAHs, DNAPL, LNAPL, and we expect Xcel Energy to make early recommendations, as part of this process, for all possible alternatives (found throughout the literature and at other sites) for sites like this. In fact, we believe that the presumptive remedy guidance for ground water, soil, and wood treatment sites may have some valuable recommendations for us to apply at this site.

Details are provided at: http://www.epa.gov/superfund/resources/presump/links.htm

Other valuable information is available on MGP sites at sites such as:
http://www.epri.com/default.asp

Another helpful guidance document is: "A Resource for MGP Site Characterization and Remediation --- Expedited Site Characterization and Source Remediation at Former Manufactured Gas Plant Sites" (EPA 542-R-99-005).

We anticipate that this work plan will address everything we need to go all the way through to the remedy selection process and perhaps even aid in design of the remedy. We want Xcel to revise the work plan to ensure that the data we collect answers all of our questions, even implementation questions. We would support suggestions for early actions, as well.

Section 4.2.3.5, page 4-59-4-60: Delete. Again, this is inappropriate for the Work Plan. However, please note that EPA agrees that this work plan needs the input of stakeholders and we have already provided this document to those stakeholders (Chippewa Nation, NOAA on behalf of all Natural Resource Trustees, WDNR, and numerous technical experts within EPA). These comments reflect their comments. Once we have a more precise work plan, we will bring it out to the general public and go through it in as detailed a manner as they want. We expect Xcel Energy to support us in this effort, since Xcel will be implementing the work plan. We want this to be a dynamic work plan and we will gladly finalize it with the knowledge that we can change it as we learn more about the site and as we get additional input from others.

Section 5.0, page 5-1 – 5-4: Delete the text and subsection titles, 5.1, 5.1.1., 5.1.2, and 5.2. This part of the Work Plan will start with the upcoming tasks to be completed, by this Work Plan. This document need not reiterate completed work already fully described in the AOC, the SOW, the Technical Letter Report prepared by Xcel, and the Technical Scoping Meeting Summary. Additionally, the background sections of this Work Plan already reiterate much of this information. Section 5.0 will instead start with the first of the tasks to be accomplished through this work plan.

Please also note the following comments on the text that was provided in the draft work plan for your information:

This discussion on community involvement support suggestions would have been appropriate in the form of a letter to EPA. It is not text that is necessary for the Work Plan. With regards to Xcel's offer to make DCA tools available to the Agency, we thank Xcel for its offer. Xcel's community involvement staff should send additional details to EPA's Briana Bill and WDNR's John Robinson and provide contact names at EPA Region 6 regarding its previous Site use. Ms. Bill and Mr. Robinson will ascertain the usefulness of DCA techniques in this community involvement program. Please note that WNDR is the lead agency for community involvement at this Site.

As previously reiterated in the SOW, Xcel Energy will assist EPA and WDNR in implementation of the Community Involvement Program, if directed to do so by EPA. EPA and WDNR may request Xcel's participation at public meetings, public information sessions, presentations at schools, and in preparation of fact sheets or other written materials (e.g., maps, photographs, charts) to be presented at meetings based on the RI/FS work, and in other educational activities related to the Site and the Superfund program. EPA may also request web support.

We suggest that the revised section 5 be outlined as follows:

Section 5.0 RI/FS Tasks
- 5.1 Purpose and DQO Review
- 5.2 **Field Investigation / Site Characterization (Task 3 of the SOW)**
  - 5.2.1 Mobilization Activities
  - 5.2.2 Demobilization Activities
  - 5.2.3 Field Activities
    - 5.2.3.1 Soil Boring Installation and Soil Sampling
    - 5.2.3.2 Monitoring Well Installation and Groundwater Sampling
    - 5.2.3.3 Sediment and Surface Water Sampling
      - 5.2.3.3.1 Surface Water Sampling
      - 5.2.3.3.2 Sediment Sampling
    - 5.2.3.4 Air Sampling
    - 5.2.3.5 Waste Investigation / Test Pits
    - 5.2.3.6 Geophysical Investigation
    - 5.2.3.7 Ecological Investigation
    - 5.2.3.8 Treatability Studies
  - 5.2.4 Recordkeeping

5.4.1 Remedial Action Objectives Technical Memorandum

5.4.2 Alternatives Screening Technical Memorandum

5.5 **Treatability Studies (Task 6 of the SOW) – If EPA requests such work**

5.5.1 Determine Candidate Technologies

5.5.2 Conduct Literature Survey and Determine Need for Testing

5.5.3 Treatability Study Work Plan / Sampling and Analysis Plan / Health and Safety Plan

5.5.4 Treatability Study Performance

5.5.5 Treatability Study Evaluation Report

5.5.6 Refinement of Alternatives Screening based on Treatability Studies (if necessary)

5.6 **Detailed Analysis of Alternatives (Feasibility Study / Focused Feasibility Study Report) (Task 7 of the SOW)**

5.6.1 Detailed Analysis of Alternatives

5.6.1.1 Nine Criteria Analysis

5.6.1.2 Comparative Analysis

5.6.2 Feasibility Study Report

We recommend the following text for this section and/or provide commentary on what should go in these sections (and provide comment on the draft text provided by Xcel concerning technical information from the draft work plan:

5.1 Purpose and DQO Review

Data will be collected during the RI/FS process to satisfy the following objectives:

- The collection of data to characterize physical and chemical conditions at the Site and to evaluate the nature, magnitude, and extent of contamination in the affected media;
- Identify and evaluate past and/or current discharges into Chequamegon Bay/Lake Superior;
- The update of the WDNR assessment of risk to human health and the environment based on the additional data collection efforts under this work plan;
- Collection of data for treatability studies (if EPA deems them necessary) and feasibility studies; and
- The evaluation of appropriate remedies.

Specific DQOs are attached to each sample/analysis, to ensure that each of the RI/FS goals are achieved. DQOs are detailed in the QAPP.

5.2 **Field Investigation / Site Characterization (Task 3 of the SOW)**

5.2.1 Mobilization Activities

Prior to commencement of on-site activities, the following arrangements will be made:

- Site access will be coordinated through Xcel Energy;
- A staging and decontamination area for equipment will be arranged;
- Underground utilities will be marked and utility maps obtained from the city of Ashland;
- Diggers hotline will be contacted for utility clearance prior to completing the Geoprobe soil borings, or any other borings (such as for piezometers or wells);
- A complete site survey will be performed to produce a detailed site topographic map referenced to the Wisconsin State Plane Coordinate System. The survey will specify existing sample locations and will mark out the sample locations for these field activities; and
- EPA will be given notification 14 business days prior to the beginning of field activities.

Fieldwork will not proceed with any subsequent activities or tasks until receiving EPA approval for the following deliverables: RI/FS Work Plan, Field Sampling Plan (FSP), and Quality Assurance Project Plan (QAPP).

5.2.2 Demobilization Activities

URS will provide logistical support for investigation derived waste disposal, as outlined in the FSP. Following field activities (or during field activities) all sample locations not accurately marked previously or changed subsequent to the original site survey, (soil, sediment, surface water, air), will be surveyed by a State of Wisconsin licensed surveyor. EPA will be notified in writing within 7 days of completion of field activities.

5.2.3 Field Activities

The planned field activities are described herein. This description includes the sampling locations, frequencies, analytical parameters and rationale (Table 5-1 and Figure 5-1). Methods and procedures that will be used to complete the planned activities are described in detail in the FSP and QAP

5.2.3.1 Soil

Surface soil samples are defined as samples from the 0 to 1 foot below grade. These will be collected to determine if there are any contaminants on the surface, serving as a direct contact threat to human health and the environment. Previously, surface soil samples were only collected in the following locations (insert a map that shows the locations). Therefore, the following locations within and surrounding the former MGP must be sampled: (insert a map delineating the unpaved areas surrounding the former MGP that have never been sampled or require samples because previous sampling events did not analyze surface soils at appropriate method detection levels). In addition, surface samples must be taken in areas that may be impacted by potential other sources (landfill, other industries that used the filled-in land) (insert a map that shows these locations). Please also note that Figure 11 depicts "background" soil samples along a highway which would actually represent disturbed conditions. Previous comments address background sampling.

Subsurface soil samples will be collected via soil borings (Geoprobe and/or other methods) and/or during any additional well installation activities. Subsurface samples are defined as foot below grade and lower.

General Comments to assist with the revision: All soil samples should be addressed in one section, not in multiple sections as provided for in the current versions of the WDNR and URS work plans. The same applies to subsurface soil borings by hand auger, geoprobe, subsurface soil borings via monitoring well or piezometer installation. The same also applies to test pitting, trenching, geoprobes, surface water sampling, air sampling, etc. This work plan must be clear and very easy to follow. Everything having to do with certain types of samples, no matter where they are taken (near the MGP, near the marina, near the RVs, along the shoreline), needs to be addressed in one section. One map showing the locations of all similar types of samples should be prepared for ease of use. One table should be prepared for each kind of sample showing the parameters, analytical methods, method detection limits, etc.

We agree on many locations for surface soil samples. That is, we recommend that surface soil samples be taken in unpaved areas around the former MGP, on unpaved areas in the surrounding residential areas (check Sanborn maps to determine whether or not residential homes existed at the time the plant was operating – if the homes weren't there, it may be necessary to check the plots of land that were previously open – and/or target those homes for vapor intrusion monitoring or another method to determine if the home could have been built on coal tar. Areas around the microwave tower, the storage yard, the historic filled ravine, the playground area of Our Lady of the Lake School, areas below the bluff in the park area that haven't been sampled yet, areas around the swimming beach in Kreher Park, and the areas near the marina, and the open fields near the Chequamegon hotel. All of these areas may be impacted by the former MGP, former land disposal operations, or former operations by other entities that utilized that property. All of the samples should be analyzed for the potential COCs previously identified, and either the full suite of Target Compound List / Target Analyte List substances (especially if other non MGP sources are suspected).

In general, the current sample locations marked SS-1 through SS-8 may be adequate for the area closest to the MGP, but, the rationale for those locations isn't provided. Was this based on a random grid of the unpaved areas? Referring back to the WDNR/SEH workplan, it appears that the recommendations for SS-1 through SS-8 came from WDNR and according to SEH's text, previous EPA, WDNR, and Xcel discussions in the past. SEH recommended 8 samples on Xcel property and 4 background samples for the "upper bluff." However, upon evaluation of these locations as specified in the draft work plans, it appears that the proposed background locations are actually too close to the former MGP and potential landfilled areas, and the locations where lumber mills operated in the past. True background samples are recommended further away from the Site, in undisturbed locations. It is important to have surface soil samples that are definitely not impacted by contamination (whatever that contaminants' origin is). A location or locations east of the Chequamegon Hotel and west of the Kreher RV park are therefore recommended. Perhaps a good location would be the historic park area (the former fort) across the street from the Palmida store and/or some locations that are unpaved back in some residential areas east or west (and south) of the Site. Historical maps and historical information previously obtained by Xcel should help in selected areas nearby that were never used for landfill or industry.

Surface soil samples in some of the woodland areas can give us "background" in areas that have been, and remain wooded. Surface soil samples in residential areas can give us details of what the surface soil is composed of in the residential areas, that are not near the former MGP or former area of lumber mill operations, or former WWTP area, or other landfilling activity.

With regards to areas below the bluff, along areas frequented by human beings and other organisms, SEH recommended 12 surface soil samples within the "solid waste dump area," 10 surface soil samples within the Historic Coal Tar Dump, 5 surface samples within the former seep area, and another 20 random surface soil samples not within areas that might be considered "hotspot" locations. These seem like appropriate locations to sample; that is, in areas that are suspected to be contaminated to verify presence, absence, and if present, quantify the levels for risk assessment work. In addition, random sampling in areas that aren't suspected as "dump" areas will verify that such areas are clean.

Therefore, EPA highly recommends surface soil samples in areas considered "hotspots" and then random locations, to verify the presence or absence of widespread contamination throughout the area between the upper bluff and the shoreline. This is the only way to confirm the actual extent of Site contamination. The number of samples is highly dependent upon what we can ascertain from past data and from some simple field based methods. That is, approximately twenty years performing investigations of this nature have verified to us that even areas that don't necessarily appear contaminated based on historical information and photographs have often been contaminated just below the surface, which makes randomized sampling across a large area that may have been "landfilled" all the more important. To save time and effort however, non-invasive, fast field methods can help in such an investigation.

We would therefore propose a pre-soil sampling field effort to screen for potential contaminant areas. First, utilize the visualizations we previously recommended. Chart out where samples were taken previously and what areas weren't even sampled. Then, using the quarterly ground water montoring data, prepare a visualization of where the NAPL is traveling through the ground, and where we haven't even looked yet. Target the areas where we've never obtained any samples or where the sampling wasn't adequate (based on the data review). Then, we would survey the area to define the potential groundwater flow pathways and areas of soil contamination. This could be most efficiently be accomplished by using a sampling strategy that we have found to be highly successful at other sites with DNAPL and NAPL, including MGP sites. That is, the soil work could start with a soil gas survey, using a passive soil-gas system such as EMFLUX® which could help provide information on discrete contaminant pathways and provide data on the lateral distribution and types of contaminants present in the vadose zone. The soil gas survey method can readily detect the presence of VOC contamination and some light end SVOCs in soil and groundwater. The presence of BTEX and similar compounds may be used to identify locations where the presence of NAPL in the subsurface is likely. Passive soil-gas sampling devices can be installed in a 50-foot grid across the entire Site. Samplers can be placed, for example, every 25-feet along transects placed strategically to intersect known and likely areas of contamination across portions of the Site. Soil gas samplers can also be placed at 20-foot intervals along transects adjacent to the current boundary of the Site and along the lakeshore to locate where contaminants may be discharging into the Bay. Placement along the lakeshore in front of the marina and along the swimming beach in Kreher Park can help confirm whether or not these other inlets are being impacted via the groundwater pathway. Based on the soil gas survey, surface and subsurface soil sample boring locations can be selected. The Field Sampling Plan would provide the details for soil gas sampling, soil core logging, and soil sampling.

Soil sampling, soil classification, hand borings, and direct push methods must follow the State of Wisconsin procedures (and the manufacturers' procedures). The draft WDNR/SEH workplan provides its survey, field screening, soil classification, hand auger boring, hydraulic probe (direct push) methods in sections 5.3.6.1.1 through 5.3.6.1.5. As appropriate, based on our decisions concerning field screening methods to be followed by sampling, these procedures shall be incorporated into the revised Xcel Work Plan. It will be sufficient to incorporate the specific procedures directly into the field sampling plan. The name of the procedure and the cross-reference to the Field Sampling Plan can just be included in the body of the general Work Plan.

Please also note our comments on the current draft version of the soil sampling sections:

> 5.3.1.1, page 5-6: The background sample locations are within the site boundary. The background samples should be collected from areas that are outside the influence of contaminants from the site. With regards to Geoprobe borings, it is

stated that they will be advanced a minimum of five feet below the base of the filled ravine, or to a maximum depth of 20 feet. No rational is provided for these depths. We expect the revised work plan to contain rationales for the sample locations, horizontally and vertically. This may be moot if we move to a dynamic field program and come up with general provisions for the soil sampling program based on quick data collected in the field.

5.3.1.1, page 5-7: Three samples are proposed from each location and it states that one would be from the unsaturated zone, though nothing is specificied about the two other locations. As previously discussed we agree with the use of field screening methods to select locations to take samples from. The Field Sampling Plan section for the methodologies should be cited in the text, to help field personnel when implementing the work. With regards to background samples, again, the locations must be areas not affected by site contamination.

5.3.2.1, page 5-13: Soil borings are also discussed in this section regarding well drilling. Collection of samples at 2.5 foot intervals is not justified in the text. Shouldn't continuous logging be conducted in order to define the geology and identify visual contamination? The first paragraph discusses the procedure to follow in the case that coal tar is encountered. It is apparent that a fair number of wells already exist along the axis of the plume, however, it is recommended that additional wells be considered to delineate the extent of the plume. This section also states that split spoons will be collected at 2.5 intervals – does this mean that two spoons will be collected in each 5 foot section? Again, why not continuous? With regards to well development, it may be necessary to utilize methods in addition to pumping water out, such as surging techniques.

5.2.3.2 Monitoring Well Installation and Groundwater Sampling

Recommended text:

Based on information developed to date for the Site, it is clear that groundwater has been contaminated by the former MGP. It may also be contaminated from other sources and/or industries that have existed in the lower ravine and along the shoreline. Site-related contamination has already been found in the fill, the Miller Creek Formation, and the Copper Falls Formation. Contaminants are present in dissolved phase and NAPL form. Additional hydrogeological assessment is necessary to evaluate the full nature and extent of the groundwater contamination. Of particular concern are the public drinking water "artesian" wells that are actually located within the Site boundaries.

Suggestions for this section:

Insert a table with a summary of all existing groundwater montoring wells: Well Designation, Screened Depth (and formation it is screened in), Date Installed, Piezometric surface level (from the last monitoring event), Presence or Absence of Contaminants of Concern from the last round of sampling; Highest and Lowest levels of contaminants through time. The current version of the work plan contains tables in different sections noting the monitoring well designations for wells screened in the Copper Falls Aquifer and wells installed in Kreher Park. It would be much more helpful to have the type of chart discussed above. It is important to be able to easily relate the wells and hydrogeology near the MGP, near the homes and schools, and down in the landfill area and with the wells that are the city's artesian drinking water wells.

Insert a 1-D overview plume map showing what we know about the horizontal extent of the plume and a 3-D map or cross sectional view showing the depth of the plume across the site.

Insert a succinct summary regarding the December and May well installations (which would have been done as part of this work, or simply refer to a summary provided in an earlier section of the work plan) and mention that additional wells may be installed depending upon the most recent data and the field work.

Please also note our comments concerning the specific text in the draft version of the groundwater sampling sections:

> Section 5.3.1.2, Page 5-7: No NAPL sampling is proposed during the monitoring well sampling. Discuss why such sampling isn't proposed. Is it adequate to assume that we are just locating the NAPL from the MGP and we are assuming that the constituents and levels are equivalent to our previous sampling closer to the original source?

See the General Comment on the Field Sampling Plan, which suggests using low-flow sampling methodology instead of purging four well volumes.

Section 5.3.1.2, Page 5-8: It is recommended that each well be tested for presence of free-phase hydrocarbons using appropriate equipment. In addition, the stipulation that 6 rounds of sampling will be conducted during this investigation should be removed. Quarterly sampling of ground water has been on-going for many years and an extensive database already exists. The purpose of our investigation is to define the extent of contamination and ascertain where the ground water component is traveling to and what receptors it is currently affecting and may affect in the future (and if it can impact any drinking water wells and surface water bodies / sediment). At this stage of the investigation, we recommend delineating the contamination and obtaining chemistry wherever there are data gaps. For this particular program, and the purposes of our data quality objectives, only one or two more rounds of sampling need be completed. Once the subsurface LNAPL, DNAPL, and dissolved phase contaminants are located horizontally and vertically, we can refine a longer-term monitoring program, if necessary. WDNR will be able to provide its applicable or relevant and appropriate requirements concerning contaminant tracking as part of this program.

Section 5.3.2.1, page 5-13: Soil borings are also discussed in this section regarding well drilling. Collection of samples at 2.5 foot intervals is not justified in the text. Shouldn't continuous logging be conducted in order to define the geology and identify visual contamination? The first paragraph discusses the procedure to follow in the case that coal tar is encountered. It is apparent that a fair number of wells already exist along the axis of the plume, however, it is recommended that additional wells be considered to delineate the extent of the plume. This section also states that split spoons will be collected at 2.5 intervals – does this mean that two spoons will be collected in each 5 foot section? Again, why not continuous? With regards to well development, it may be necessary to utilize methods in addition to pumping water out, such as surging techniques.

Section 5.3.2.1, Page 5-14: A method to remove the coal tar has not been incorporated either in this Work Plan or the FSP. Please revise to include a method applicable for coal tar collection from a monitoring well.

Section 5.3.2.2, Page 5-15: The first paragraph is somewhat confusing. Include language stating that well MW-2C is double cased with a steel casing to a depth of 70 ft bgs.

Section 5.3.3.1, Page 5-16: Provide rationale for how the depth of the monitoring wells were determined.

Section 5.3.3.1, Page 5-17: Instead of limiting the depth of the well screen to between a depth of 7 to 8 feet bgs, indicate that the well screens will be set in such a manner as to intersect (straddle) the water table.

Please provide the rational for the shallow piezometers. What information will they proved that the shallow, adjacent monitoring wells will not provide? Indicate the target depth for the screens in these piezometers, in either feet below ground, or relative to some geologic contact.

Figure 11: Based on information presented in Section 4.2.1.2, there could be product present near MW-15 B and MW-21B. A soil boring investigation is suugested in the work plan for the around MW-15B. It is recommended to add one boring location south of MW-15 B or utilize the field method suggested above. It is also recommended to install wells or use other field techniques to check for presence of coal tar or free product.

No investigation has been planned around MW-21 B. A comprehensive investigation around MW-21B to identify source for benzene and/or product should also be conducted.

Figure 9: This figure contains a reference to another report for the BTEX isocontours. Please include the basis for these isocontours in the form of points on the map with concentration totals.

Figure 10 and Appendix A: This comment is only to document that the vertical extent of contamination is not defined at location 50, and contamination does not appear to be laterally defined at points 6, 7 and 34.

As with the soil boings and other methods, installation of wells and piezometers are to follow State of Wisconsin procedures. Hollow stem auger techniques, rotary borings, monitoring well and piezometer installation, as well as decontamination techniques are fully described in the WDNR/SEH draft work plan, sections 5.3.6.1.6, 5.3.6.1.7, 5.3.1.8, and 5.3.6.1.9. Specific procedures cited include: ASTM-D 1586-84, NR 141 Wis. Admin. Code, WDNR Form 4400-113A, WDNR Form 4400-113B, WDNR Form 3300-5B. All such forms and requirements should be included within the Field Sampling Plan's Standard Operating Procedures section or appendix. The FSP can provide the detailed descriptions.

5.2.3.3 Sediment and Surface Water Sampling

5.2.3.3.1 Surface Water Sampling

Recommended text:

To determine surface water quality, surface water samples will be collected from within the inlet, near the swimming beach, near the marina, and in background locations.

Comments and questions: The background information in the Xcel Draft Work Plan and the SEH Draft Work Plan do not provide information on the physical state of Chequamegon Bay's water. Representative water sampling techniques are dependent upon the condition of the surface water, for example:

Stratification – Stratification in a water body can be thermally or chemically induced. The temperature profile is often the controlling force in the circulation of the water body. The warm less dense surface water (epilimnion) and the deeper cold water mass (hypolimnion) become stratified and create a thermocline region where the temperature changes rapidly with depth. The position of the thermocline varies but is typically less than 30 meters below the surface. Chemically-induced stratification generally results when two levels of a water body are separated by a steep salinity gradient (here, in Chequamegon Bay, there would be no salinity gradient). The epilimnion is exposed to the atmosphere, whereas the hypolimnion is a "confined" stratum which is vented only during seasonal overturn. These two zones may thus have very different concentrations of contaminants if: 1) the point of discharge is to one zone only; 2) the contaminants are volatile (thus vented in the epilmnion but possibly not in the hypolimnion); or 3) the surface stratum is influenced by short-term flushing due to inflow or outflow of shallow streams.

Current – A current is a large portion of water moving in a certain direction. Currents can disturb mixing zones and reduce the chances of obtaining a representative sample. For example, a strong current can carry and distribute contamination over a larger area or move contaminated sediments in the downstream direction of the current.

Storm Events – Storms may turn over strata in a water body and reduce the representativeness of the sample. Increased precipitation or runoff may increase of decrease representative concentrations of contaminants. For example, a large storm will dilute the concentration of contaminants in a water body. A water body which receives surface water runoff may show a higher concentration fo contaminants from the ensuing runoff than are representative of the water body under "normal" conditions.

Time of Year – Temperate water bodies such as lakes experience two periods of overturn annually. As air temperature cools in the fall, the epilimnion becomes cooler and eventually isothermal conditions exist in the lake. Overturning and total mixing occurs. Similar overturning occurs again in the spring. The chemical compositon of lakes and ponds can vary considerably depending on the season. Variations can occur during periods of increased water movement due to termperature variations, vegetation decay, freezing and thawing, as well as turnovers and inversions. The time of year also influences rainy and dry periods.

Circulation – Lakes shallower than 5 meters are subject to mixing by wind action. Large-scale motion in lakes may be either wind driven or the result of density gradients. Sediment distribution may be dominated by either or both types of water motion. If a water body lacks stratification, the entire lake may be circulated or mixed by wind-generated motion.

Velocity – The speed at which a surface water body flows can affect the selection of sampling locations, times, equipment, and techniques. Varying flow rates across or within the cross-section of the water body can lead to non-homogeneous mixing of contaminants, producing different phases.

Turbidity – Surface water may contain suspended particles of fine sediments or solid contaminants. These particles may have higher concentrations of contaminants adhering to their surface area than is dissolved in the aqueous portion of the sample. Turbidity will vary due to mixing and settling in the water body.

Representative sampling ensures that a sample or group of samples accurately reflects the concentration of the contaminants of concern at a given time and location. Analytical results from representative samples reflect the variation in pollutant presence and concentration throughout a site. The sampling procedures identified in this section need to reflect the sampling objectives (the data quality objectives for surface water sampling) and the aforementioned physical/chemical characteristics of Chequamegon Bay.

Referring back to the Work Plan's data quality objectives and our recommendations, surface water sampling would answer the following questions, for example:

1. What contaminants present in Chequamegon Bay water are attributable to this Site (from all the potential primary and secondary source areas)?

2. How does this contamination affect human health and the environment? That is, what are potential surface water pathways of exposure and to whom? For example, since we are concerned about children possibly ingesting contaminated surface water over at the swimming beach, then, we would take grab samples or possibly composite samples of surface water that can possibly be swallowed by a swimmer. Since the swimming beach is where we know there are swimmers, that is one location for taking samples and a composite across the area would probably give us adequate information. There is also the potential for ingestion by a swimmer that does not abide by the signs and that goes swimming in the prohibited area. Therefore, surface water samples would also be necessary in this area to address the fact that the current prohibition may still allow a pathway of contamination to be completed.

With regards to organisms living within the inlet and organisms that spend only a portion of their time in the inlet, bioaccumulation data, rather than actual surface water samples may be more appropriate. That is, species specific fish tissue samples can answer the question as to how much contaminant from both surface water and sediment exposure affect the specific fish. Some fish ingest sediment dwelling organisms and ingest contaminated surface water. Some fish only ingest contaminated surface water. A caged mussel study can provide us with a composite sample over a period of time what is actually ingested by an invertebrate and what is in the water column. Is this type of sampling sufficient to answer our questions and meet our data quality objectives?

What about subsistence anglers? Is there the potential for certain fish to be caught and eaten on a regular basis that are affected by the site? Is there either fish tissue sampling or surface water sampling that can answer these questions?

3. What contaminants are getting into the surface water via the sediment secondary source versus surface runoff or through the upwelling from the aquifer system into the lake? Passive diffusion bag samplers can be installed below the depth of saturation in the Bay, along the bank, to identify persistent contaminant discharge into the Bay. The bag samplers can be placed along the area that we know is contaminated, as well as the areas we are testing to determine extent of contamination (e.g., along the marina shoreline, along the swimming beach shoreline).

With regards to the type of sampling, the plan has to be specific as to grab samples versus composite samples. A grab sample is a discrete aliquot from one specific sampling location at a specific point in time, and may be considered representative of homogenous conditions over a period of time and/or geographical area. When obtaining grab samples from a water body with stratified layers, each layer must be sampled separately. However, because the release of a contaminant in a surface water body is subject to variance over time and distance, a grab sample may not be representative and it would be preferable to use a composite sample. A composite sample is defined as a non-discrete sample composed of two or more aliquots (of equal volume) collecting at various sampling points or times. It can represent portions collected at various locations, various times, or a combination of both location and time variables. Composite samples are made by combining grab samples collected at defined intervals. There are four types: areal, vertical, flow proportional, and time. Composites, by definition, reflect an "average" concentration within the area, flow, or interval. Composites can mask problems by diluting isolated concentrations of some contaminants to below detection levels. Compositing is not recommended where volatile compounds are a concern.

With regards to surface water sampling, in addition to chemical consitituent analysis, it is important to collect information on dissolved oxygen, pH, temperature, conductivity, and oxidation-reduction potential. This information can be used to ascertain whether or not there is stratification. Knowledge regarding stratification is necessary to develop an appropriate sampling strategy.

Xcel's Draft Work Plan section 5.3.4 did not specify surface water sampling at all, nor did it mention it in section 4.2.2.4, which did discuss tissue sampling. Tissue sampling may be another way of determining surface water quality, though not specifically direct to surface water quality (depending upon the species sampled). The SEH work plan anticipated 8 sets of surface water column samples to be co-located with caged bivalve study locations and 10 sets of surface water column samples from shallow (less than 8 foot depth) near the shoreline. All of the samples were limited to within the one inlet, but for 2 samples out beyond Kreher Park (in what is referred to as "background"). We would instead recommend both actual surface water samples and samples via tissue to meet all of the data quality objectives). Actual surface water samples would be for the human health risk assessment (in order to quantify any contaminants that may be ingested by adult and child swimmers, and anglers that accidentally fall into the water). Benthic macroinvertebrate tissue samples or a caged mussel study could provide the data needed for the ecological risk assessment with regards to impacts from contaminants present in surface water.

Figure 16 of the SEH workplan provides locations for both types of samples, however, there is no explanation for the position of the samples. We would recommend that the revised Xcel Work Plan utilize a representative sampling program taking into account the variables mentioned above. For example, judgmental sampling can be used to select locations that are frequented by swimmers, for example. Random sampling can be used to select locations when there are many potential areas to sample over a large area and there are no obvious areas to sample based on all of the preexisting information. OSWER Directive 9360.4-16 provides the details for the various judgmental and random sampling techniques to ensure that the sampling program is representative.

5.2.3.3.2 Sediment Sampling

The URS/Xcel work plan refers back to the draft section 4.2.2. Refer back to our comments on Section 4. The SEH/WDNR draft work plan describes sediment sampling for use in toxicity studies and benthic macroinvertebrate study. As previously discussed, EPA will require sediment sampling to answer particular questions as follows:

1. Definition of the extent of contaminated sediment; that is, is the current "boundary" hypothesis correct? Based on the SEH/WDNR description of sediment contamination, it is probable that the extent of contamination in Chequamegon Bay is beyond the the embayment formed by the marina jetty and the former lumber docks since Winter 2003 sampling showed the presence of low level SVOC concentrations east and west of those locations. Further delineation is necessary to evaluate the extent of contamination. Both horizontal and vertical sampling into the sediment is necessary. Again, a representative sampling program must be utilized to give us confidence in the extent and volume of contaminants in the embayment and possibly beyond the embayment. Randomized sampling is recommended to achieve this.

2. Sediment sampling to assess the physical parameters is also necessary to ascertain the transport mechanisms and/or stability of the sediment.

3. Sediment sampling for use in potential treatability studies can also be accomplished (samples can be archived and used at a later date).

4. Depending upon whether or not benthic invertebrates are sampled, sediment samples may be taken to help establish impact of sediments on the benthic invertebrates. Sediment

samples may also be collected as part of a habitat study to establish the types of organisms that are living within certain sediment regimes.

This section must provide the details on all of the sediment sampling investigatory work. This section can reference the Field Sampling Plan for the standard operating procedures.

5.2.3.4 Air and Vapor Intrusion Sampling

Recommended text: Air samples shall be obtained to characterize the indoor air and outdoor air exposure routes specifically, the inhalation of volatile and particulate emissions from soils, indoor air, outdoor air (e.g., such as during high energy events in which oil slicks appear on Chequamegon Bay), and, if any nearby homes are found with a private well, via ground water (e.g., showering). Of particular concern are children that utilize the playground near the former MGP facility, the residents in the homes immediately surrounding the MGP, recreational users along the swimming beach, marina, and walking/jogging path that goes through the Site, congregants and workers at the Church, and workers at the Xcel Energy building at the former MGP facility.

Comment: The information provided in URS/Xcel draft work plan, section 5.3.1.3 is generally acceptable but requires more detail. We would also suggest real-time air monitoring, during the course of field work, which can be serve for both health and safety of the field investigators and can be used to show conditions in the breathing zone for the people mentioned above. Enclosed is a real-time air monitoring plan utilized during construction work at another site. This plan can be revised and adopted for use during our investigatory work. Real-time monitoring during soil boring activities, test-pit digging, and sediment sampling can also be used to help evaluate any air impacts that may occur during implementation of any potential remedial action.

Please note that the Technical Letter Report mentions two vapor intrusion samples to be collected from the two manholes on St. Claire Street, but, the draft work plan did not incorporate this. In addition, the vapor probes at VP-3 are incorrectly identified as VP-2S and VP-2D. The depths for the vapor probes may be adequate, but, the work plan did not provide a rationale for selection of the depths.

Please also note the specific changes recommended on the original text (Bold):

5.3.1.3 Upper Bluff / Filled Ravine Soil Vapor **Migration and** Intrusion Investigation

Soil vapor ~~Air~~ samples will also be collected to evaluate the **indoor** inhalation pathway for exposure to hazardous vapors **migrating through soils directly from the contaminant source and from impacted groundwater . The first phase of the** soil vapor intrusion investigation will consist of the collection **soil vapor** samples from vapor monitoring probes **strategically placed around the perimeter of groundwater contamination related to the the site.** All **soil** vapor samples will be collected in accordance with SOPs included in the FSP and USEPA draft guidance (December 2001) entitled *Evaluating The Vapor Intrusion To Indoor Air Pathway From Groundwater and Soils.* **If needed, the second phase of a soil vapor investigation and an indoor air investigation will be conducted in accordance with the above guidance, as well as subsequent follow-up USEPA guidance for investigating vapor intrusion. As noted above, this draft USEPA guidance has limitations when used to evaluate contaminants other than chlorinated solvents, such as aromatic solvents and petroleum or coal-tar related compounds. However, this guidance has useful components that, when appropriate, will be incorporated into this investigation and subsequent evaluation.**

All **soil vapor, indoor** air, **background air** samples will be analyzed for VOCs by **EPA** Method TO15A. The VOCs included in this analysis are listed in Table 2 of this work plan.[2] All **TO15A** samples will be collected in **evacuated** summa canisters provided by the laboratory, and shipped via overnight courier to the laboratory. Summa canisters are shipped from the laboratory under negative pressure; when the valve on the canister is opened air is drawn into the canister. A regulator will be used to collect the indoor air sample over a 24 hour period; the **soil vapor and** background samples will be collected over a one-hour period. Grab samples will be collected from the vapor probes by connecting the canister to the tubing, and opening the valve. These canisters will be filled in less than one minute. Air samples will be collected in accordance with SOPs included in the FSP.

Soil Vapor Investigation

2 The TO-15 parameter list is larger than the VOCs list included in Table 1 soil/groundwater/sediments list derived by Battelle (see Footnote #19).

Soil vapor samples will be collected from soil vapor probes installed along the northeastern and southwestern edges of the groundwater contaminant plume, coal tar source areas and former MGP plant. These samples will provide data used to evaluate potential vapor migration and to ensure that soil vapors are not migrating towards adjacent private properties. Initial soil vapor probe locations will be placed between buildings and where groundwater concentrations for total VOCs are above 10,000 μg/L. At least four rounds of soil vapor samples will be collected at the following nine monitoring probe locations:

- From vapor monitoring probe VP-1 installed in the filled ravine area east of the Xcel Energy administration building near the southeast corner of the asphalt parking lot;
- From vapor monitoring probes VP-2S and VP-2D installed in the filled ravine south of and along St. Clair Street, north of the paved courtyard area;
- From vapor monitoring probes VP-3S, VP-3I, and VP-3D installed near well MW-2R in the Xcel Energy storage yard north of St. Claire Street; and
- From vapor **monitoring** probes VP-4 **VP-5, VP-6 and VP-7, which will be evenly spaced along an arc spanning from the MW-18 monitoring well cluster,** approximately 25-feet east of the edge of the filled ravine, **to the western corner of St. Claire Street and Prentice Avenue. The vapor monitoring probes on this arc will evaluate soil vapors for impacts from groundwater having total VOCs above 10,000 μg/L. VP-5 will be placed immediately east of the monitoring well cluster at MW-18. VP-4 will be placed halfway between SS-3 and St. Claire Street. VP-6 will be placed along the north side of St. Claire Street, across from the Xcel Energy Service Center storage yard and in the immediate vicinity of SS-2. VP-7 will be placed on the north side of St. Claire Street, near the corner of Prentice Avenue**
- **From vapor monitoring probes VP-8 and VP-9 will be installed along the south side of 3rd Street, with VP-8 be placed in the immediately south of the monitoring well cluster at MW-21, and VP-9 immediately south and directly across 3rd Street from the monitoring well cluster at MW-22.**

At two locations on Xcel Energy property, a nest of up to three vapor probes will be installed (at shallow, intermediate, and deep intervals). Two of these probes (VP-2 and VP-3) will be directly above the most contaminated areas of the historic ravine, and soil vapor samples from these two probe nests will likely be sufficient to evaluate the worst-case soil vapor.

Locations of the other five soil vapor probes (VP-1, VP-4, VP-5 VP-6, VP-7, VP-8 and VP-9) are not directly above areas of known coal tar product contamination, but will be directly above or near areas with significant groundwater contamination (VP-1, upgradient near the main Xcel office on Lakeshore Drive, and VP-4, VP-5 VP-6 and VP-7 side gradient and east side of the storage lot on St. Claire Street, and VP-8 and VP-9, side gradient and west of 3rd Avenue). Four rounds of soil vapor samples from each location will assist with the evaluation of potential vapors from areas of known contamination.

Vapor monitoring probes will be installed in shallow soil borings advanced with a Geoprobe drill rig. Each probe will consist of a Geoprobe implant and small diameter tubing encased in a flush mount well casing cemented in place. Geoprobe implants are small diameter (1/4 – 3/8-inch) wire screens constructed of double woven stainless steel. Implants will be installed by advancing the drill rod to the target depth, inserting the implant through the drill rod. The implant is then connected to a drive point on the lead drill rod. When the drill rod is pulled back, the implant is anchored in place by the drive point. Implants 6-inches in length will be installed with 12-inches of fine sand placed around the implant. Granular bentonite will be used to backfill the borehole annular space seal above the sand pack. Vapor probes will be installed in accordance with SOPs included in the FSP.

Implants will be installed in the unsaturated zone at shallow, intermediate, and deep intervals. Implants installed at the deep interval will be installed approximately one foot above the saturated zone to evaluate the migration of soil vapors from groundwater. Shallow interval implants will be installed in native soil approximately 2-feet below ground surface to evaluate the migration of vapors to the surface. An implant will be installed at an intermediate interval at locations where the unsaturated zone is thicker than 10 feet. At the VP-1 VP-4, **VP-5, VP-6, VP-7, VP-8, and VP-9** locations, implants will be installed at shallow intervals between 1 and 2 feet below ground surface to evaluate the migration of vapors from known areas of contamination. (VP-1 is located in the filled ravine, but up gradient from the MGP facility. VP-4 **VP-5, VP-6, and VP-7 are ~~is~~ located 25 to 60 feet away and east from the filled ravine and along the north side of St. Claire Street. VP-8 and VP-9 are located 160 to 200 feet away and west from the filled ravine.)** Because subsurface coal tar contamination is present at the VP-2 and VP-3 locations, implants will also be placed at multiple intervals at these locations. At the VP-2 location, the unsaturated zone is approximately 5-feet thick. (Groundwater has historically been encountered at an approximate depth of 5 feet in well TW-13). The implant for VP-2S will be installed between 1 and 2 feet bgs, and the implant for VP-2D will be installed between 3 and 4 feet bgs. At the VP-3 location, the unsaturated zone is approximately 15-feet thick. (Groundwater has historically been encountered at an approximate depth of 15 feet in well MW-2R). The implant for VP-2S will be installed between 1 and 2 feet bgs, and the implant for VP-2D will be installed between 13 and 14 feet bgs. The implant for VP-3I will be installed between 1 and 2 feet bgs, and the implant for VP-2D will be installed between 6 and 7 feet bgs.

Four rounds of **soil vapor** samples will be collected **in Phase 1 of the soil vapor vapor investigation.** The first round of **soil vapor** samples will be collected a minimum of one week following vapor probe installation, **with the second round collected approximately two weeks following vapor probe installation.** Assuming the first **and second rounds are** collected during the spring, summer, or fall, the **third and fourth rounds of soil vapor** sampling will be collected **one week apart** during the winter months (frozen conditions).

The Phase 1 action levels for perimeter or upgradient soil vapor probes will be based on EPA's "$1x10^{-5}$ risk target shallow soil vapor screening concentrations" 3. If, after the second or subsequent rounds of Phase 1 sampling, concentrations of site-related contaminants in soil vapor exceed this action level, then further investigative actions are needed and Phase 2 will be implemented. If the soil vapor samples from Phase 1 from the immediate proximity of a nearby private building (eg VP-5) and the initial results from two rounds exceed the action level, Phase 2 should be skipped and an indoor air investigation of the nearby building should be immediately conducted.

Phase 2 will expand the physical dimensions of the Phase 1 soil vapor investigation to locations further away from known or suspected contaminant sources in order to rule out whether vapor migration has reached nearby buildings. Under Phase 2, additional soil vapor probes will be installed to evaluate soil vapors in close proximity or abutting against nearby buildings. The decision on the placement and number of soil vapor probes will be based on where action levels were exceeded in Phase 1. Phase 2 will collect at least four rounds of soil vapor samples and the results will be evaluated against the same action level as in Phase 1. Should the findings of Phase 2 investigation show that site-related soil vapors are above action levels and may be potentially infiltrating into homes, a Phase 3 indoor air investigation will be developed and implemented.

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3 U.S. EPA *Evaluating The Vapor Intrusion To Indoor Air Pathway From Groundwater and Soils*, Draft, December 2001, Table 2a: Question 4 Generic Screening Levels and Summary Sheet for Risk=$1x10^{-5}$.

5.3.1.3.2 Indoor Air and Subslab Vapor Investigation

Should soil vapor sampling during Phase 1 or Phase 2 demonstrate soil vapor levels close to nearby buildings exceeds the action level, the Phase 3 indoor air investigation should be developed and implemented. The Phase 3 investigation will examine the constituents of indoor air and sub-slab soil vapors to determine whether these areas are being impacted by soil vapor migration and intrusion. Due to many other potential indoor and external sources of solvents, the results from indoor air sampling can be difficult to explain and unless accompanied by simultaneous soil vapor samples. It is optimal that soil vapor samples are collected from directly beneath the lowest slab of the building. It is preferred that subslab soil vapor samples be collected from at least two, opposite locations. Subslab soil vapor samples can demonstrate the presence of vapors directly beneath the building that may be entering through cracks, sumps, exposed soils or other locations. If a subslab soil vapor sample is not practical, then the next acceptable location for soil vapor sampling is from a soil vapor probe located as close as possible to the edge of the building foundation, preferentially inserted at an oblique angle, so as to collect a soil vapor sample that is best representative of conditions *beneath* the foundation.

For each home investigated during Phase 3, there will be four rounds of sampling, with two indoor air samples and two subslab vapor samples collected per round. For the two indoor air samples, one will be from the basement and one will be from the main living space on the ground floor (eg living room or kitchen). For the two subslab vapor samples, two vapor sample probes will be installed in opposite corners of the basement floor that will enable the collection of soil vapors that have accumulated beneath the basement slab.

Simultaneous to each round of indoor air/subslab vapor sampling will be a round of ambient air samples, and a round soil vapor samples from each soil vapor probe location.

The subsurface migration of soil vapors is accelerated when reaching open or porous pathway, such as cracks in bedrock and gravel backfill around underground utility lines, and water mains and laterals. Vapors could also move through cracks in sewer lines and get inside. During each round of the indoor air/subslab investigation, air samples will also be collected

from all sanitary sewer/storm water/ and other manholes along St. Claire Street, between Prentice and Third Avenues. Additionally, sewer and other utility lateral lines running to each home from each main will be inspected for potential lateral vapor migration. Should air samples collected in the sewer man holes be elevated, then a further investigation will be conducted of these lateral lines.

During Phase 3, soil vapor samples from vapor probes will be collected concurrent with indoor **air/subslab vapor samples collected from nearby homes and the Xcel Energy Service Center building. Also concurrent with each indoor round of air/subslab vapor samples will be a round of ambient air samples. There will be at least two ambient air sample collected for each round of the Phase 3 investigation. One ambient air sample will be located upwind of the buildings being investigated, and the other ambient air sample will be located downwind. Background ambient air samples will be from locations that are not impacted by potential airborne releases from the Ashland/NSP Lakefront site and other nearby, unrelated sources (such as gas stations on Highway 2). Background sample locations can be either on- or off-site, but should be selected using professional judgement and based on locations not likely to be adversely impacted by potential releases from nearby sources, both site and non-site related. Additionally, the selection of these background ambient air sample locations must take into account current and forecasted weather conditions.**

Prior to collecting the indoor air/**subslab vapor** sample **in each home**, background conditions **affecting indoor air quality** will be evaluated. This evaluation will include the following steps:

Step 1 Inspect the sample location area to identify consumer products (e.g. cleaners, paints, or glues) that may contribute to increased indoor air concentrations absent any subsurface contribution.

Step 2 Complete an occupant survey to identify occupant activities (e.g. smoking, welding, or operations of small engines, gasoline power tolls, or fleet vehicles) that may contribute to increased indoor air concentrations absent any subsurface contribution.

Step 3 Remove or prevent use of all potential sources that may contribute to increased indoor air concentrations absent any subsurface contribution for a minimum of 24 hours before sample collection.

Step 4 Collect an ambient (outdoor) air sample in conjunction with the indoor air sample.

All air and background samples will be analyzed for VOCs by Method TO15A. The VOCs included in this analysis are listed in Table 2 of this work plan.4 All samples will be collected in **evacuated** summa canisters provided by the laboratory, and shipped via overnight courier to the laboratory. Summa canisters are shipped from the laboratory under negative pressure; when the valve on the canister is opened air is drawn into the canister. A regulator will be used to collect the indoor air sample over a 24 hour period; the background sample will be collected over a one-hour period. Grab samples will be collected from the vapor probes by connecting the canister to the tubing, and opening the valve. These canisters will be filled in less than one minute. Air samples will be collected in accordance with SOPs included in the FSP.

The air sampling results from probes will be applied to the Johnson and Ettinger model (see Section 4.2.1.1) and compared to the indoor air sample results. Depending on data obtained from VP-1, an indoor air sample may be collected from the administration building. The model output will serve as the basis to evaluate any indoor air detections.

5.2.3.5 Waste Investigation / Test Pits

Note: The text in the existing draft work plan, section 5.3.3.2 is generally acceptable. The locations of the test pits may be altered depending upon the results of the field screening work. However, the historical maps do provide excellent information regarding the potential for buried waste.
Soil borings, direct push, and other methods can be referenced from the soil section, above. Additionally, please note the depth of the test pits (and geoprobe borings) did not include justification. How was the depth determined?

5.2.3.6 Geophysical Investigation
Recommended text:

Field activities will include GPR methods to better define the bedrock surface and to identify the presence of preferential pathways such as bedrock fractures, subsurface channels, or underground

4 The TO-15A parameter list is larger than the VOCs list included in Table 1 soil/groundwater/sediments list derived by Battelle (see Footnote #19).

pipelines not yet identified during previous investigations. Where the data indicate the presence of subsurface preferential pathways or pielines, sampling locations may be modified accordingly to focus on site features that require further characterization. Other geophysical survey methods that may be considered feasible, based on site-specific conditions include seismic refraction (SR) and electrical resistivity.

Borehole geophysics will be conducted to verify and/or to collected subsurface geologic information at the two artesian wells and two additional bedrock wells for the purpose of determining the condition of the artesian well construction and to characterize the bedrock for fracture density, orientation, aperture, and continuity. Borehole geophysical tools will include a natural gamma survey and an electromagnetic conductivity induction log survey.

A downhole video survey of the artesian wells and two other wells completed into bedrock will assist with the geophysics. Direct video camera observation will show any fractures and provide direct information. The video survey of the artesian wells will ascertain whether the wells are pulling water from just the copper falls, from the deeper bedrock, or a combination (including the Miller Creek and the upper fill).

Please note: Xcel recommended wells MW-2C and MW-2BR for borehole geophysics, in addition to the artesian wells. Depending upon the most recent well installation work, other wells may be deemed more appropriate.

Please note: Reference should be made to specific SOPs in the FSP for the various geophysical work and downhole camera work.

5.2.3.7 Ecological Investigation

Refer to Section3 and 4 comments regarding the ecological investigation and:

Recommended text:

An ecological investigation of the Site will be conducted to characterize existing Site conditions relative to the vegetation community structure, wildlife utilization, and sensitive ecological resources. This assessment will obtain sufficient information to characterize ecological conditions at and in the immediate vicinity of the Site boundaries to support the remedial investigation and ecological risk assessment. The ecological assessment consists of a characterization of wildlife habitat/usage, a wetland delineation, an assessment of wetland functions and values, and an identification of endangered/special concern species.

5.2.3.7.1 Characterization of Wildlife Habitat/Usage

The purpose of this field characterization is to identify and map ecological conditions at and in areas near the Site that are potentially affected by the migration of Site contaminants. Conditions at the Site and in the adjacent areas will be visually inspected. Observations on habitat conditions, wildlife utilization, and contaminant exposure pathways will be made and will include the following types of ecological information:

- Vegetation community/cover types (including size and location) at and in areas immediately adjacent to the Site;
- Dominant vegetation species and general observations of abundance/eiversity within each cover types;
- Topographic features;
- Aquatic habitat characteristics;
- Observations of wildlife habitat, including species identification and use activity;
- Indications of environmental stress that could be related to site contaminants.

Observations from this field survey will be recorded in a field logbook and photo documented. A cover type/habitat map of the site will be prepared, noting locations of aquatic habitats and developed land. The results of this characterization will be presented in the ecological risk assessment as well as in the ecological characterization section of the RI Report.

5.2.3.7.2 Wetland Delineation

Site wetland systems will be delineated according to the routine methods outlined in the Corps of Engineers Wetland Delineation Manual (1987). The wetland delineation points will be surveyed in the field by a licensed land surveyor. Documents to be reviewed include U.S. Geological Survey mapping, U.S. Dept. of Interior National Wetland Inventory mapping, State of Wisonsin Freshwater Wetland Mapping, Soil Conservation Survey, and aerial photographs of the Site. It is expected that wetland conditions do not exist on the upper bluff area, but may exist along the shoreline. Results of the wetland delineation along with the functional analysis of wetlands will be presented in the RI Report.

5.2.3.7.3 Assessment of Wetland Functions and Values

An assessment of wetland functions and values will be conducted for any wetlands identified in the wetland delineation. This assessment will be performed following the methodology provided in the U.S. Army Corps of Engineers' Wetland Evaluation Technique (WET) Volume II: Methodology (Adamus, et al., 1987). Results of this evaluation will be presented in the RI Report.

5.2.3.7.4 Identification of Endangered and Special Concern Species

Information on State- and Federally-listed threatened, endangered or rare species shall be requested from the U.S. Fish and Wildlife Service and Wisconsin Department of Natural Resources. This information will be requested for the area within 2 miles of the Site. Information on sensitive ecological communities and special concern species will also be requested from these agencies as well as from the National Oceanic and Atmospheric Administration. Information received will be reviewed, organized, and presented in the ecological characterization section of the RI Report.

5.2.4 Recordkeeping

Recommended text:

Details of field and laboratory records and data management and storage are detailed in the FSP and QAPP.

5.2.5 Sample Analysis/Validation

Recommended text:

The methods for analysis are detailed in the QAPP. The procedures for data validation are detailed in the QAPP.

Comment: A table should be completed or a reference made to a table in one of the work plan documents that contains the sample parameters by matrix, sample method, sample reporting limits, and the appropriate cleanup criteria objectives (i.e. MCLs, PRGs, etc). This table helps to ensure that the reporting limits will meet the cleanup criteria objectives.

5.2.6 Data Evaluation

Recommended text:

This task includes efforts related to the compilation of remedial investigation analytical and field data. Validated data will be entered into the EPA-specified database and tabulated for use. The data from previous sampling efforts and data from this remedial investigation will be reviewed and carefully evaluated to identify the nature and extent of site-related contamination.

Details of the procedures for assessing the precision, accuracy, representativeness, completeness and comparability of field data and analytical laboratory data are described in the QAPP.

The data will be evaluated for useability, including any uncertainties associated with the data. The data will be checked against the DQOs identified in the QAPP. Any qualifications to the data usability will be discussed in the quality assurance section of any reports presenting the data.

After completeion of the sampling and analysis portion of the remedial investigation, results of laboratory analyses will be compared to reference and background samples and screening levels (EPA Region 9 soil screening levels, EPA MCLs for groundwater, other State of Wisconsin, EPA, or NOAA criteria, where available).

The general guidelines of preparation of data for the RI report are:

- Tables of analytical results will be organized in a logical manner such as by sample location number, sampling zone, or some other format which can be discussed as Xcel prepares the document.

- Analytical results will not be organized by laboratory identification numbers since these numbers will not correspond to sample location maps. The sample/locatioin/well identification number will always be used as the primary reference for the analytical results. The sample location number will also be indicated if the laboratory sample identification number is used.

- Analytical tables will indicate the sample collection dates.

- The detection limit will be indicated in instances where a parameter was not detected.

- Analytical results will be reported in the text, tables and figues using a consistent and conventional unit of measurement such as ug/L for groundwater analyses and mg/kg for soil analyses.

- EPA's protocol for eliminating field sample analytical results based on laboratory/field blank contamination results will be clearly explained.

- If the reported result has passed established data validation procedures, it will be considered valid.

- Field equipment rinsate blank analyses results will be discussed

5.2.7 Human Health Risk Assessment Amendment
(see all of the previous comments)

Recommended text:

Risk Assessment involves the characterization of potentially adverse effects from exposure to contaminants in the environment. The objective of the Risk Assessment will be to determine whether site contaminants pose a current of potential risk to human health and the environment in the absence of any remedial action. It provides an analysis of baseline risks to determine the need for remedial action at sites and a basis for determining cleanup levels which will adequately protect public health and the environment. Furthermore, it provides a method for comparing the potential health impacts of various remedial alternatives and a consistent process for evaluating and documenting public health and ecological threats at hazardous waste sites.

The purpose of the baseline human helath risk assessment is to provie a risk-based interpretation of the dat a collected during the RI and provide conservative estimates of potential human health risks. The results of the risk assessment may also be used to identify areas that may be considered for no further action, prioritize early actions, and determine the need for additional field work. The objectives of the baseline risk assessment are to:

- Quantify exposures and characterize baseline risks to potentially exposed individuals (both current and future) at or near the site;

- Identify those chemicals which ay pose risks to human health; and

- Provide the basis with which to assess the need, if any, for additional studies.

The data collected as part of this work plan will be put together with appropriate data from previous studies and the baseline human heath risk assessment work previously completed by WDNR to create this new/revised or amended baseline human health risk assessment. The methodology for updating the work will follow that present in the *Risk Assessment Guidance for Superfund: Vol. I Part A – Human Helath Evaluation Manual* (USEPA, 1989) and several more recent regulatory guidance documents as appropriate such as:

- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24, March 2001)
- Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (EPA/540/R/99/005, OSWER 9285.7-02EP, PB99-963312, September 2001)
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (OSWER 9285.6-10 December 2002)

Comment: An extremely useful reference containing up-to-date guidance and screening levels is: http://risk.lsd.ornl.gov/rap_hp.shtml and this reference should be incorporated into the Work Plan. The tools and models on the aforementioned site can be used to assist in the Risk Assessment work.

The approach that will be followed for the risk assessment incorporates the four fundamental components associated with the human health risk assessment process: Data Evaluation, Exposure Assessment, Toxicity Assessment, and Risk Characterization, respectively.

The content of the original draft work plan text by WDNR on risk assessment methods follow EPA guidance; there are some equations which may have typos in them. In an effort to finalize the work plan and proceed, we have suggested a simpler outline to follow. It would be equally satisfactory to simply include a paragraph and the general text stating that upon receipt of the additional data, both the human health and ecological risk assessments previously prepared by WDNR will be amended and updated. The following contains some recommended general text:

5.2.7.1 Site Characterization / Data Evaluation

Separate data sets will be created for each medium (soil, groundwater, surface water, air, and sediment), and summary statistics – including detection frequency, arithmetic mean concentration, maximum detected concentration, standard deviation, and 95% upper confidence limit of the mean (UCL) – will be generated for each data set as summarized below:

- Nondetect values will be included in the summary statistics by using on-half of the limit of detection;
- Estimated detects (J qualifier) will be considered as true detects;
- Sample duplicates will be averaged in accordance with EPA guidance;
- The distribution of concentration values will be determined for each data set using the D'Agostino-Pearson K^2 test (D'Agostino et al, 1990). A minimum of 8 values (preferably more than 20) is required for this test, and more than on-half of the values should be detected concentrations. If this test cannot be used due to a small sample size or a large number of nondetects, the data distribution will be identified as not determined and assumed to be lognormal (EPA, 1992b).
- The arithmetic mean concentration will be used as the exposure-point concentration in the central tendency evaluations;
- The reasonable maximum exposure (RME) evaluations will use the 95% UCL or the maximum detected concentration (whichever is lower) as the exposure-point concentration;
- The Soil Outdoor Vapor Model will be used to calculate the exposure point concentrations of COPCs in air from soil as vapors and particulates (USEPA, 1996).

Note: utilize the formulas directly from EPA guidance documents for calculating standard deviation as well as the 95% upper confidence limit for each data set (lognormal distributions and normal distributions).

Laboratory procedures and data for chemical analyses of the samples will be reviewed for quality assurance. The quality assurance review will be conducted to verify that laboratory quality assurance and quality control procedures were completed and documented, as required by the referenced methods, and that the quality of the data is sufficiently high to support their intended use.

Data validation procedures and qualifier assignments will be completed according to the EPA Contract Laboratory Program National Functional Guidelines for Evaluating Organic Analysis (USEPA, 1999a). Results for all applicable field quality control samples will also be reviewed to provide additional information in support of the data validation and data quality assessment.

During data validation, appropriate data qualifiers will be assigned to specific results when quality control criteria or other method-specific criteria are not met. Data qualifiers will be assigned in accordance with guidance specified by the functional guidelines (USEPA, 1999a) and using best professional judgment. Data qualified as estimated (J) are considered acceptable for their intended uses; however, these data may be less precise or less accurate than unqualified data. All data qualified as estimated J have an acceptable degree of uncertainty and represent data of sufficient quality and reasonable confidence (USEPA, 1989) and are considered fully usable for this project. Rejected , R, data are considered unusable for their intended purposes.

Exposure point concentrations shall be calculated following methods presented in EPA 2002 (Calculating
Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites).

The models presented in EPA 2001 (Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites) should be used to calculate exposure point concentrations for vapors and particulates in outdoor air.

In selecting COPCs, the risk based screening levels should be reduced by a factor of 10 to account for potential cumulative risks. Therefore, the comparisons below, when we are *concerned about cumulative risks, must be reduced by a factor of 10.*

Maximum concentrations of chemicals detected in soil will be compared to USEPA risk-based screening levels to select COPCs:

- USEPA Maximum Contaminant Levels (MCLs);
- USEPA Region 9 Preliminary Remediation Goals (PRGs);
- USEPA Region 3 Risk-Based Concentrations (RBCs);
- USEPA Region 6 Human Health Screening Levels (HHSLs)

Groundwater data will be compared to USEPA MCLS.

Surface water data will be compared to Federal ambient water quality criteria (AWQC).

Sediment data will be compared to the Region 9 PRGs calculated for soils under a residential scenario.

If the maximum concentration of a chemical does not exceed the risk-based screening level, the chemical will be eliminated from further evaluation in the risk assessment. If there is no risk-based screening level for a chemical, the chemical will be considered a COPC and will be further evaluated in the risk assessment.

In general, essential nutrients such as calcium, magnesium, potassium, and sodium are not quantitatively evaluated in the risk assessment as the potential toxicities of these minerals is significantly lower than other inorganics detected at the Site and more data are available with respect to identifying dietary intack rather than toxicity.

Comment: See the following additional comments on the Xcel work plan section 5 on risk assessment:

Section 5.5.1.3, Page 5-22:
It is recommended that instead of using average concentrations for samples with duplicate samples, highest measured concentrations be used.

Section 5.5.2, Page 5-23: It is recommended that the data summaries should follow Risk Assessment Guidance for Superfund Part D format.

Section 5.6: Residential RBSCs should be used in determining COPCs in soil, to ensure that cumulative effects of contaminants are not overlooked and to ensure that no residual contaminants remain should land use change in the future.

Section 5.6.2: New guidance is available from U.S. EPA on exposure point concentration calculation (i.e., ProUCL) and dermal exposure (i.e., RAGS Part E).

Section 5.6.2.3.1: As in all the other parts of the work plans, references to areas of concern should be eliminated. This section should refer to the known source areas and the potential source areas to be investigated as part of this study. Previous comments apply to the descriptions of the areas. For purposes of the risk assessments, the Site can be looked at as a whole and the exposed populations would be based on their potential to be exposed to contaminants from different areas. Please also note that with regards to the drinking water issue, a residential survey should be conducted to ensure that all the homes do in fact use city water and do not have their own artesian wells. As previously commented upon, the city's redevelopment plans call for expansion of both the park and the marina and this plan should be incorporated into the work plan as an appendix.

Section 5.6.2.3.2: While residential land use is not considered the most likely future use of the entire site, this receptor group should be considered for all areas within the site to provide a bounding estimate of risk posed by the site. With regards to the Conceptual Site Model, more detail could be provided at this time, based on all the previous work. Previous comments on the CSM apply to this section. With regards to the pathways of exposure, please refer to previous comments. Most importantly, the pathway for fish consumption will require amendment based on information from the Bad River Band and the Red Cliff Band of the Chippewa Nation. There are subsistence anglers that need to be considered in this risk assessment.

In order to proceed with finalization of this work plan, we request that we agree that the information in the text for risk assessment can be revised as we proceed with data collection activities. Ultimately, the risk assessment work must simply be performed in accordance with EPA guidance.

Section 5.7, Page 5-55: The title for Item Number 7 should be Baseline Human Health Assessment. In Item Number 7 the title "Characterization of Site and Potential Receptors" is duplicated for d and e. Item Number 7 does not contain Toxicity Assessment and Select Chemicals.

5.2.7.2 Exposure Assessment

Recommended text: Exposure assessment involves the identification of the potential human exposure pathways at the site for present and potential future-use scenarios. Present conditions are as they exist today and future conditions are based on potential future land uses of the site. Potential release and transport mechanisms will be identified for contaminated source media. Exposure pathways identified in the WDNR risk assessment will be finalized by assessing information gathered during this additional RI field work. The exposure pathway links the sources, locations, types of environmental releases, and environmental fate with receptor locations and activity patterns. Generally, an exposure pathway is considered complete if it consists of the following four elements:

- A source and mechanism of release;
- A transport medium;
- An exposure point (i.e., point of potential contact with a contaminated medium); and
- An exposure route (e.g., ingestion) at the exposure point.

All present and potential future-use scenarios considered will be presented; however, only some may be selected for quantitative analysis. Justifications will be provided for those exposure pathways retained and for those eliminated.

A detailed description of the physical environmental setting, such as geologic setting, hydrogeological setting, surface water details, soil type, and drinking water (artesian well and any other private wells located in the area) will be included.

Note: It is expected that the conceptual site model will be refined as part of this work and the risk assessments completed in accordance with the data collected as part of this study, which builds upon the previous data (not necessarily all of the previous conclusions). The conceptual site model integrates historical information to preliminarily define source areas, release and transport processes, points of contact with affected media, complete and incomplete exposure routes, and potentially exposed populations for current and expected future land and water uses. Once the new RI data is evaluated and available, the Conceptual Site Model, previously described in Section 4, will be revised.

5.2.7.3 Toxicity Assessment

Recommended text:

The toxicity assessment provides a framework for characterizing the relationship between the magnitude of exposure to a COPC and the nature and likelihood of adverse health effects that may result from such exposure. In human health risk assessment, chemical toxicity is typically divided into two categories: carcinogenic and noncarcinogenic health effects. Potential health effects are evaluated separately for these two categories, because their toxicity criteria are based on different mechanistic assumptions and associated risks a expressed in different units. USEPA toxicity information will be iused in the baseline risk assessment to evaluate both carcinogenic and noncarcinogenic risks associated with each chemical of concern and route of exposure.

Pertinent toxicological information for COPCs will be selected from the following sources, in accordance with EPA guidance (2003c):

Tier 1 – Integrated Risk Information System (IRIS), available on-line

Tier 2 – EPA's Provisional Peer-Reviewed Toxicity Values (PPRTVs)

Tier 3 – Other Toxicity Values (e.g., California Environmental Protection Agency, The Agency for Toxic Substances and Disease Registry, and EPA's Health Effects Assessment Summary Tables (1997b).

The dose-response/toxicity assessment presents the general toxicological properties of the selected COPCs using the most current toxicological human health effects data. Toxicological profiles will be included for all selected COPCs. Those chemicals which cannot be quantitatively evaluated due to a lack of toxicity factors will not be eliminated as COPCs on this basis. These chemicals will instead be qualitatively addressed for consideration in risk management decisions for the site.

A slope factor is a plausible upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime and is usually the upper 95^{th} % confidence limit of the slope of the dose-response curve expressed in $(mg/kg/day)^{-1}$. In risk assessment, a slope factor is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular level of a potential carcinogen.

For the evaluation of noncarcinogens in the risk assessment, chronic and subchronic reference doses are used. A chronic reference dose is an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without appreciable risk of deleterious effects during a lifetime. Chronic reference doses are generally used to evaluate the potential noncarcinogenic effects associated with exposure periods between six years and a lifetime. Subchronic reference doses aid in the characterization of potential noncarcinogenic effects associated with shorter-term exposure (i.e., less than six years).

Toxicity endpoints/target organs for noncarcinogenic COPCs will be presented for those chemicals showing hazard quotients, segregation of the hazard index by critical effect and mechanism of action will be performed as appropriate.

5.2.7.4 Risk Characterization

Recommended Text:

In this section of the risk assessment, toxicity and exposure assessments will be integrated into quantitative and qualitative expressions of carcinogenic risk and noncarcinogenic hazards. The estimates of risk and hazard will be presented numerically in spreadsheets contained in an appendix.

Carcinogenic risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. Per RAGs, the slope factor converts estimated daily intakes average over a lifetime of exposure directly to incremental risk of an individual developing cancer. This carcinogenic risk estimate is generally an upper-bound value since the slope factor is often an upper 95 % confidence limit of probability of response based on experimental animal data used in the multistage model.

The potential for noncarcinogenic effects will be evaluated by comparing an exposure level over a specified time period with a reference dose derived fro a similar exposure period. This ratio of exposure to toxicity is referred to as a hazard quotient. This hazard quotient assumes that there is a level of exposure below which it is unlikely even for sensitive populations to experience adverse health effects. If the hazard quotient exceeds one, there may be concern for potential noncancer effects; however, this value should not be interpreted as a probability. Generally, the greater the hazard quotient above unity, the greater the level of concern.

In general, EPA recommends a target value or risk range (i.e., hazard index =1 or risk = 10^{-4} to 10^{-6}) as threshold values for potential human health impacts. The results presented in the spreadsheet calculations will be compared to these target levels and discussed. These levels aid in determining the objectives of the baseline risk assessment, which include determining whether additional response action is necessary at the site, by providing a basis for determining residual chemical levels that are adequately protective of human health, by providing a basis for comparing potential health impacts of various remedial alternatives, and to help support selection of the no-action remedial alternative, where appropriate.

Carcinogenic risks and noncarcinogenic hazard values will be combined across pathways as appropriate. Applicable or relevant and appropriate requirements will be presented for the appropriate chemicals and will be compared to site concentrations detected at and around the Site.

5.2.7.5 Uncertainty Analysis

In any risk assessment, estimates of potential carcinogenic risk and noncarcinogenic health effects have numerous associated uncertainties. The primary areas of uncertainty and limitations will be qualitatively discussed. Quantitative measure of uncertainty will involve the calculation of central tendencies. Central tendency evaluation involves the use of 50^{th} percentile input parameters in risk and hazard estimates as opposed to 90^{th} percentile parameters used in the RME calculations. The 50^{th} percentile parameters are considered representative of the general receptor population, but may underestimate the true health impacts to sensitive receptors. The chemicals driving the risk assessment will be evaluated using these average exposure assumptions and the 95 percent UCL concentration to derive risk. The central tendency risks will be discussed in releation to RME risks. Central tendency analyses will only be calculated for pathways in which RME risks are considered unacceptable (carcinogenic risks above 10^{-4} and HI above 1).

There are also uncertainties associated with:

- Data collection and evaluation;
- Assumptions regarding exposure scenarios;
- Applicability and assumptions of models selected to predict the fate and transport of COPCs in the environment;
- Parameter values for estimating intake of COPCs.

5.2.8 Ecological Risk Assessment Amendment

Comment: All of the previous data, appropriately flagged/qualified, will be incorporated into an amendment of the WDNR 1998 Ecological Risk Assessment. Data collected for addressing the gaps in the previous work will be incorporated and a revised ecological risk assessment will be carried out. See all of our previous comments concerning ecological risk assessment in Section 4.

5.3 **RI Report (Task 4 of the SOW)**

The text in section 5.7 of the original draft is acceptable for this section. In the executive summary of the RI Report, it may be useful to summarize how the data gaps identified by CSTAG were addressed by the study.

5.4 **Development and Screening of Alternatives (Task 5 of the SOW)**

The text in section 5.8 of the original draft is acceptable for this section.

5.4.1 Remedial Action Objectives Technical Memorandum

5.4.2 Alternatives Screening Technical Memorandum

5.4.3 Comparative Analysis of Alternatives Memorandum

5.5 Treatability Studies (Task 6 of the SOW) – If EPA requests such work

The text in Section 5.9 of the original draft work plan is acceptable.

5.5.1 Determine Candidate Technologies

5.5.2 Conduct Literature Survey and Determine Need for Testing

5.5.3 Treatability Study Work Plan / Sampling and Analysis Plan / Health and Safety Plan

5.5.4 Treatability Study Performance

5.5.5 Treatability Study Evaluation Report

5.5.6 Refinement of Alternatives Screening based on Treatability Studies (if necessary)

5.6 Detailed Analysis of Alternatives (Feasibility Study / Focused Feasibility Study Report) (Task 7 of the SOW)

The text in Section 5.10 of the original draft work plan is acceptable for this section.

5.6.1 Detailed Analysis of Alternatives

5.6.1.1 Nine Criteria Analysis

5.6.1.2 Comparative Analysis

5.6.2 Feasibility Study Report

Section 5.11 This text is acceptable. The section number should be revised to 5.7 if the aforementioned chapter numbers are revised as recommended.

Section 6.0: Based on the Xcel's receipt of these comments the week of July 26th, 2004, we would propose the following schedule:

1. Xcel requirement for 21 day Revision of Work Plan – Because of the complexity of this work plan and the extent of comments provided, EPA will work with Xcel to revise the Work Plan. We have provided Xcel, already, with recommended text revision and propose that we meet to be able to answer any of Xcel's questions regarding our revisions. In addition, we have proposed a more dynamic field based approach to be followed regarding soil sampling, air and soil vapor monitoring,

sediment sampling, etc. It will be necessary to prepare significant revision to the work plan (and consequently the Field Sampling Plan and Quality Assurance Project Plan). At the multi-day meeting, we propose to "hammer out" the basis of the dynamic field based sampling program and then, Xcel can finish revising the Work Plan to reflect the program we agree to at that meeting.

2. EPA's proposes that we hold a technical meeting, including the WDNR technical staff, Bad River Band of the Chippewa Nation technical staff, Red Cliff Band of the Chippewa Nation technical staff, and NOAA technical staff to discuss these work plan revisions and finalize the sampling program by mid to late August and that we have a Final Work Plan by mid September and that EPA is able to approve this document, and its associated QAPP by the end of **September**.

3. Field work can therefore commence in Fall 2004. Based on the comments provided, we expect that all of the soil, air, soil vapor, and test pit sampling can commence between October and December 2004 (weather dependent). We expect that fish tissue sampling can be conducted as well as surface water sampling and benthic habitat surveys. (Surface water sampling may be in the form of grab or composite samples or through caged mussels). Sediment sampling may be conducted after the ice is stable over the lake. Any additional sampling may be performed in the Spring. We would expect that any treatability study needs can be assessed during the next few months and we would expect any treatability studies to be conducted by the Spring 2005. **Therefore, the field work shall be conducted from Fall 2004 through Spring 2005.**

4. EPA expects that the electronic data submission requirement and the EPA and NOAA data management software is a savings in both time and cost. As data is collected and run through validation, it can be immediately graphed, tabled, charted, and various visualization maps and cross-sections can be made, in practically real time. This can greatly assist in data interpretation and comparison to reference location results, background data, and the various proposed remediation goals (MCLs, etc.). Therefore, we expect Xcel to be able to start drafting up the RI Report as data comes in. Because of all of the previous work, the general sections of the RI Report are essentially already written. Additional data simply needs to be incorporated to fill in the data gaps, as well as the descriptions of the field work to be conducted. We expect that as the data is gathered for the various contaminated media and exposure pathways, the two risk assessments can be updated and revised. We therefore expect Xcel to submit the Draft RI Report, which includes the Draft Human Health Risk Assessment, and Draft Ecological Risk Assessment within 3 months of its receipt of the

final data validation package. Assuming that sampling is completed by April, 2005, then the **Draft RI Report, Draft HHRA and Draft ERA will be submitted to EPA by August 2005.**

5. EPA recommends that the technical team meet frequently (at a minimum quarterly) to review data gathered and discuss. This will help Xcel in preparation of its documents with the goal that regulatory review time can be significantly reduced. If problems arise, the team will be able to resolve issues early and adjust the schedule accordingly.

6. Final RI Report and Risk Assessments are therefore expected to be received by EPA by November 2005.

7. Remedial Action Objectives (RAO) Tech Memorandum is due by 30 days from submission of Draft RI Report. (**September 2005**).

8. Alternatives Screening Tech Memorandum is due by 30 days from EPA's comments on RAO Tech Memorandum (**November 2005**).

9. Comparative Analysis Technical Memorandum is due by 30 days from EPA's comments on Alternative Screening Tech Memorandum (**January 2006**).

10. Feasibility Study Report is due by 45 days of EPA comments on Comparative Analysis Tech Memo (**March 2006).**

11. Revised Draft FS Report would be due 21 days after any comment/revision by EPA (**May 2006).**

Once the FS is essentially completed, EPA **may** have to go before the Remedy Review Board and the Contaminated Sediments Technical Advisory Group (depending upon the results of the RI, risk assessments, and FS). For the purpose of Xcel's planning, we'd expect this to occur in May or June of 2006. Thereafter, a proposed plan for remedial action would be issued for public comment. In addition to the public meeting we hold on the proposed plan, we expect to have frequent public meetings, or public availability sessions as the field work and report writing is on-going, depending upon public interest. WDNR is leading our community involvement activities, and, as previously discussed, Xcel's participation with community involvement activities will be requested. Based on this schedule, we'd expect the public comment period to occur between June and August of 2006. A Record of Decision would then be drafted by the Agency by September 2006.

Section 7.0

We request that the following technical personnel from the Chippewa Nation and NOAA receive copies of the monthly reports and Draft/Final documents submitted:

Kirsten Cahow
Water Resources Specialist
Bad River Natural Resources Department
Bad River Band of Lake Superior Chippewa Indians

Charlotte Dawn
Geologist
Red Cliff Natural Resources Department
Red Cliff Band of Lake Superior Chippewa Indians

Jennifer Lawton
Associate Coastal Resource Coordinator
National Oceanic and Atmospheric Administration

In the future, additional trustee representatives may request to be included on our technical distribution list.

Figures 2 and 3

Please increase the font size to make all of the text legible in the body of the figure.

Figure 11

Based on information presented in Section 4.2.1.2, there could be product present near MW-15 B and MW-21B. Soil boring investigation is planned in the area of MW-15B. It is recommended to added one boring location south MW-15 B. It is also recommended to install wells to check for presence of product.

No investigation has been planned around MW-21 B. A comprehensive investigation around MW-21B to identify source for benzene and/or product should be conducted.

Figure 9

This figure contains a reference to another report for the BTEX isocontours. Please include the basis for these isocontours in the form of points on the map with concentration totals.

Figure 10 and Appendix A

This comment is only to document that the vertical extent of contamination is not defined at location 50, and laterally contamination does not appear to be defined at points 6, 7 and 34.

Appendix C Tables

For the RME scenarios, most exposure parameters should be based on 95% values (excluding skin surface area and body weight).

Tables C-1, C-2, and C-3

Chemical-specific dermal absorption values need to be presented in the tables for the soil/sediment dermal contact exposure routes.

For the industrial, utility/maintenance, and construction workers, the RME skin surface area exposed should be 3,300 cm2 (RAGS Part E).

For soil to skin adherence factors, the 95% values in Exhibit 3-3 (RAGS Part E) should be used for the RME scenario. The recommended RME adherence factor is 0.2. mg/cm2 (RAGS Part E) for an industrial worker (RAGS Part E; Region 9 PRG Table). For the utility worker, the 95% AF value of 0.9 mg/m3 (RAGS Part E) should be applied for the RME scenario.

The soil intake rate for a maintenance/utility worker should be 100 mg/day based on the recommended ingestion rate for an outdoor worker (Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, EPA 2001).

For an industrial worker, the long-term inhalation rate for an adult of 20 m3/day (Region 9 PRGS, Standard Default Exposure Factors, EPA 1991) should be applied. For a construction worker, a short-term inhalation rate for heavy activity of 2.5 m3/hr (Exposure Factors Handbook (EFH), EPA 1997) should be applied.

Tables C-4, C-5, and C-6

The soil ingestion rate for adult and adolescent recreational receptors should be 100 mg/day (Region 9 PRG Table; Standard Default Exposure Factors, EPA 1991).

Chemical-specific dermal absorption values need to be presented in the tables for the soil/sediment dermal contact exposure routes.

A short-term inhalation rate based on moderate activity (1.2 m3/hr) should be used for recreational exposure (EFH 1997) for a child and adolescents. For adults, a short-term inhalation rate of 1.6 m3/hr should be used based on moderate activities (EFH 1997).

Tables C-7 & C-8

An exposure time for swimming of 180 minutes per event, which is the 90% value in the EFH (1997), should be used for the RME scenario, especially since there is swimming beach on the lakefront. Adjustment of the exposure frequency based on site-specific information would be prudent if this information in available. Justify why the surface area exposed to water while wading differs from the surface area exposed to sediment while wading. A soil adherence factor for children playing with wet soil (95% is 3.3 mg/cm2) should be used as the basis for the sediment AF for the 7- to 18-year-old swimmer/wader, not an AF for an adult irrigation worker. This value could then be adjusted in half to account for some wash off, resulting in an AF of 1.65 mg/cm2.

Provide permeability coefficients that will be used for dermal absorption while swimming/wading.

Chemical-specific dermal absorption values need to be presented in the tables for the soil/sediment dermal contact exposure routes.

Table C- 10

Consumption of both predator and bottom feeder should be considered in the evaluating fish intake. The recommended 95% intake value is 170 g/day (EFH, 1997); the recreational 95% intake value is 25 g/day (EFH 1997).

FIELD SAMPLING PLAN

General Comments

The Field Sampling Plan will need to be revised in accordance with the changes to the work plan. We provide the following comments to provide Xcel with the information we would have been seeking in this FSP. But, note, that changes to the work plan would reflect other changes to the FSP. The FSP should contain the field sampling **details.**

SOPs for the specific field instruments to be used during the investigation should be included as an appendix to the FSP.

The RI/FS provides details on the sampling design, frequency, locations, etc. that are not included in the FSP (e.g., Upper Bluff/Filled Ravine Soil Vapor Intrusion Investigation). Both documents should be reviewed to insure that sampling details are incorporated into the FSP.

The Work Plan and Field Sampling Plan indicate that monitoring wells will be sampled by removing a minimum of four well volumes, and achieving stability. A bailer or a submersible pump are identified for purging. One of the stability criteria is that dissolved oxygen stabilize to within 0.2 mg/L. If a bailer is used, dissolved oxygen readings will be skewed as a result of exposure to the atmosphere. If a pump is used, then a flow-through cell would resolve this issue.

In light of the fact that inorganic constituents (metals) are to be sampled, it is in Xcel's best interest to obtain representative samples with low turbidity in order to keep the metals concentrations low. *The best method to do this is through low flow sampling* using a variable speed pump, such as a bladder pump (although submersible pumps have been successfully used in this capacity as well). We strongly recommend altering the sampling approach to employ low flow methods. In addition to the stability parameters listed in section 3.6.4, turbidity should be added as a stability criterion if low flow sampling is adopted.

Many of the subsections of section 3 continually refer to the SOPs. In general, this section should be revised to include greater detail in the text, with less emphasis on the SOPs. Some of the following comments still address this point; however, not all of the sections that rely heavily on the SOPs have been called out in the following comments.

Field parameters, such as water depth, pH, temperature, conductivity, dissolved oxygen content, visual observations, unusual conditions, are important components of fish, benthos, and sediment sampling and data analysis that need to be included in the Field Sampling Plan. All field sampling procedures should be reviewed to ensure they agree with U.S. EPA's recommended sample collection procedures presented in *Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual* (Office of Science & Technology Office of Water U.S. Environmental Protection Agency Washington, DC 20460 EPA-823-B-01-002 October 2001). This technical manual provides a compilation of current information and recommendations for collecting, handling and manipulating sediment samples for physicochemical characterization and biological testing that are most likely to yield accurate, representative sediment quality data based on the experience of many monitoring programs and researchers. This information affects SOPS 230, 240, and 250, 280, and 290.

Specific Comments

Section 2.1.1 and 2.1.2

This paragraph should state the analytical parameters that the soil samples will be analyzed for. In addition, the method of soil sample collection should be stated. The corresponding referenced SOP is vague and does not provide enough information to detail how soil samples for this project will be collected.

How was it determined that the area on the north side of Lakeshore Drive is representative of background soil conditions? Are four samples collected to determine background samples statistically adequate? Since PAHs are constituents of concern, the surface background samples should not be collected adjacent to a roadway. All surface and subsurface background samples should also be collected from the same depth(s) as the investigative samples.

Provide rationale for different number of sample locations for the background surface soil samples (four locations identified) and the background subsurface soil samples (three locations identified).

Section 2.1.2, Page 2-1

The text refers to soil samples to be collected around the perimeter of the former MGP and known locations of the former gas holders. The location of the former MGP and gas holders should be superimposed or layered on Figure 2 to that proper sample placement can be visualized and determined to be valid. What is the grid spacing? Was the grid starting point randomly generated? Triangulation of the grid points will provide better coverage of the area. How was it determined that four samples were sufficient south of the MW8 well cluster? How was the maximum depth of 20 feet determined? If there is visual observation of contamination or field screening indicates contamination at 20 feet, will the boring still be terminated at that depth? The text indicates that field screening will be used to collect a sample. Field screening procedures (i.e. head space) are not indicated in the text.

Section 2.1.2, Page 2-2

The text states that 3 geoprobe borings will be used to evaluate background conditions. The proposed soil boring background locations do not appear to be included on Figure 2. The text also states the samples will be collected at intervals of 5, 10, and 15 feet. The investigative samples will be collected to a maximum of 20 feet. Why is there a discrepancy between the investigative and background sample depths. Background samples should be collected at the stated depths and at 20 feet for a total of 4 samples per location.

The purpose of the borings in the Upper Bluff Area is to identify known and potential source areas. Although not part of the scope, it is likely that the extent of known of potential source areas will need to be identified. WESTON suggests to consider a step-out program to identify the extent of contamination. This may cut back on future work scopes that may be required to delineate the source areas.

Section 2.1.3, Page 2-2

Are any of the 16 well locations considering background locations? Which wells are upgradient? Side-gradient? Down-gradient? The text states that the samples will be collected in accordance with SOP 150. SOP 150 is vague and states procedures for bailing or using a pump. Is it projected that the wells will be bailed or pumped? If pumped, what type of pump? SOP 150 also details purging 4 well volumes. A method of low-flow groundwater sampling is highly recommended. Please consult the U.S. EPA guidance document on low-flow groundwater sampling procedures available at http://www.epa.gov/ahaazvuc/download/issue/lwflw2a.pdf. How frequently will the stabilization parameters be recorded?

Embedded Table - Please indicate if the table should read MW-2, or MW-2R. Figure 2 does not show a MW-2.

Section 2.1.4, Page 2-3

The vapor probe should be purged to remove standing vapors. The text should state the analytical parameters for analysis or reference the correct table.

Section 2.2.1, Page 2-3

The text states that "All drilling, well installation, and well development will be completed in accordance with ch. NR 141 requirements." These requirements should be detailed within the FSP and/or an additional SOP should be included that covers these tasks. Also, please provide a reference to the figure that depicts the proposed additional piezometers.

Figure depicting typical construction of monitoring well, piezometer and vapor probe should be provided.

Provide reference to appropriate figures in this section.

Section 2.2.1 and Section 2.3.1, Page 2-6

Several sections reference ch. NR 141 requirements. The field sampling plan needs to address how drilling, well installation, and well development will be in accordance with the ch NR 141 requirements. Explicit details for meeting this requirements should be identified in the Work Plan and Field Sampling Plan. Referencing a state requirement is too vague.

Section 2.2.2, Page 2-5

Embedded Table - On page 2-5, AW-1 appears twice in the list/table of wells to be sampled. Please change the second occurrence to AW-2.

Section 2.2.3, Page 2-5

There is inconsistency in well naming convention between the text and Figures 2 and 3. The text states well MW-2RB/MW-2C and MW-2A(NET). Figure 2 has MW-2BR. Figure 3 has MW-2 (NET). Please revise for consistency. The second paragraph refers to AW-1 and AW-2. Please reference which figure those wells are located on.

Section 2.3.1, Page 2-6

The text states that "All drilling, well installation, and well development will be completed in accordance with ch. NR 141 requirements." These requirements should be detailed within the FSP and/or an additional SOP should be included that covers these tasks.

A legend used in the embedded table is an “asterisk” while the foot note shows a “solid dot”. Please revise as appropriate.

Section 2.3.3, Page 2-7

SOP 140 does not include the collection of soil samples from exploration test pits. A section within SOP 140 should be added to include soil sample collection from exploration test pits. A separate SOP should be developed for the excavation of exploration test pits. The SOP should define what constitutes "obvious solid waste material", either in the text of the FSP or in appropriate SOPs. The text should be clarified to explain on what samples the TCLP analysis will be determined. Will extra sample volume be collected for each sample submitted and held by the laboratory pending results of the Table 1 parameters? The SOP should also include how the removed soil from the test pit will be handled after removal, stored and disposed.

The text states that two test pits will be excavated on each side of the former soil waste disposal area. The soil waste disposal area should be depicted on Figure 3 and presented in the legend. In addition, the test pit numbers corresponding (i.e TP100-TP108) should be called out in the text. It clarifies the text and locations. The test pit numbers corresponding to the text description should be added for all text descriptions.

In addition, footnote 2 should be included within the body of the FSP text. The portion of the FSP text body that will be created by the inclusion of this footnote should be expanded, including a discussion of how free-phase hydrocarbons will be identified in the step-out process.

Section 2.3.3, Page 2-8

The text states that test pits will be excavated to a depth of 6 to 8 feet. How was this depth determined? What is the potential width of the test pit, and length? SOP 140 is referenced for test pit samples. SOP140 does not appear to discuss test pit sample collection.

Section 2.3.4, Page 2-8

What is the proposed grid spacing in the former seep area and around TW-11? A triangular grid provides better coverage. It appears that the grid around TW-11 only steps out once in each direction. What happens if the lateral extent of contamination if further out?

The text states that "additional borings will be advanced as needed". Considering that the purpose of this soil investigation is to define the lateral extent of free-phase hydrocarbons, it is assumed that the above statement implies a step-out program. If this is true, the step-out program should be detailed, including the criteria used in evaluating if additional borings are required.

At what depth intervals will the subsurface soil samples be collected?

Section 2.4, Page 2-8

A final decision on the sampling approach for Chequamegon Bay Inlet sediment sampling should be made prior to mobilization for the RI/FS investigation. This section therefore will require modifications. The modification should only included the final approach.

Have bathymetric surveys been conducted in the bay? Such surveys are useful means of evaluating sediment stability.

Section 3, Page 3-1

The majority of this section just refers to the SOPs included in Appendix A. Most of these sections should be revised to provide greater detail within the body of the FSP. Further individual comments on the text relying too heavily on the SOPs will not be made.

Section 3.1.2, Page 3-2

The paragraph addressing backfilling of excavations every day within Kreher Park. The backfilled soil should be clean soil free of contamination to ensure that the people using the Park are not exposed. The backfilled excavation should be compacted to address significant settling following backfilling.

Visitors entering the site must be 40-hour trained in accordance with 29 CFR 1910.120, with a current 8-hour refresher as applicable, in addition to reviewing the HASP.

Please label on the figures the Our Lady of the Lake School/Church property.

Section 3.2.2, Page 3-3

This paragraph needs to be rewritten for clarity. It is unclear what is meant by "soil vapor sample collection." This section, as well as all other Sample Collection sections should go into greater detail on the actual sample collection procedures. Although the SOPs provide some detail, these sections should identify the major steps of the sample collection procedures. Provide detailed procedures for the use of the PID measurements to collect the samples.

Need for purging the vapor probes prior to sampling have not been discussed.

The need for homogenization of the soil for the specific parameter at each location is not described.

Section 3.3.2, Page 3-4

Refer to the comment on Section 3.2.2. Additionally, the Upper Bluff/Ravine area discussion should be at least in a separate sentence from the Kreher Park discussion. What is meant by a "representative sample"? This should be clarified. The term field screening can refer to passing a PID over an open split spoon or macro core; this term should be either changed, or directly related to head space sample screening. Only by reading SOP 260 is it apparent that head space screening is inferred. Indicate in this section that the results of head space screening will help determine the sample intervals to be collected for laboratory analyses.

It states that all details regarding subsurface soil sample collection will be recorded in the field logbook. Please define the details that will be recorded. It also states at samples will be submitted for laboratory analysis at the rate of one sample per every 10 feet of drilling. This conflicts with the text in section 2.1.2 that states that a minimum of three samples per boring will be collected for laboratory analysis. Please revise for consistency.

Section 3.3.3, Page 3-4

Provide a general procedure for screening with a PID. Is this a head space screening.

Section 3.4, Page 3-5

Naphthalene is a by-product of the MGP process, and it is also a volatile compound. Volatile SVOCs should also be considered for evaluation for the vapor intrusion investigation.

Section 3.4.1, Page 3-5

The introduction of the Field Sampling Plan indicates that this is a stand-alone document intended to guide the field personnel through the investigation. Please include details on Soil Vapor Probe installation in this section or included as an additional SOP.

Section 3.4.2, Page 3-5

The first sentence should say ... to collect soil vapor samples... Vapor intrusion should be deleted.

Section 3.5, Page 3-6

This section only refers to samples collected over a 24 hour period. Section 5.3.1.3 of the Work Plan indicates that background samples, outdoors, would be collected for a time period of only 1 hour. Please revise. If a 1-hour time is to be used for the background (outdoor) sampling, please provide rationale for the shorter time frame.

Section 3.6.1, Page 3-7

See comment for section 3.4.1, regarding this being a stand alone document.

Section 3.6.2, Page 3-7

See comment for section 3.4.1, regarding this being a stand alone document. Well development procedures must be detailed in the FSP. Stabilization parameters must be identified.

Section 3.6.3, Page 3-7

If a submersible pump is to be used, the type of pump, and associated procedures should be detailed in the FSP. A method of low-flow groundwater sampling is highly recommended. Please consult the U.S. EPA guidance document on low-flow groundwater sampling procedures available at www.epa.gov/ahaazvuc/download/issue/lwflw2a.pdf. Turbidity should be included as a stabilization parameter and the acceptable range provided in the text. SOPs are referenced for pH, specific conductance and temperature. SOPs should be included for dissolved oxygen and turbidity or the text modified to include this information.

Section 3.6.4, Page 3-8

Indicate that an oil/water interface probe will be used to identify the presence or absence of NAPL. This section indicates that "if time permits" a well that goes dry will be purged dry a second time. This should be changed to indicate that if a well is purged dry, it WILL be purged dry a second time prior to collecting groundwater samples.

Section 3.7 and 3.8, Page 3-9

These sections do not include any of the procedures to be used for the geophysical surveys. At a minimum, Fromm Applied Technology should be able to provide some general procedures on the equipment to be used for the gamma ray and TV surveys. This information could be included as an appendix to the FSP.

Section 3.9

This section needs to detail all of the mentioned items and procedures. What are the OSHA rules for excavation and confined space entry? How will the test pit material be screened for hazardous properties? How will the field geologist determine that soils or material is nonhazardous? What are the adequate safety precautions to be taken if a test pit is left open overnight? This information needs to be included in this section. The documentation for each test pit should also include a test pit sketch identifying the various materials encountered, with appropriate measurements for each material noted. Additionally, it would seem that entry into a test pit would be extremely dangerous and unwarranted. Please reconsider the need for entry into a test pit. This comment relates to the following sections 3.9.1, 3.9.2, and 3.9.3.

Section 3.9.1, Page 3-11

It is sated that the samples from the test pit will be collected using hand tools. Identify the hand tools to be used for the sample collection.

Section 3.9.2, Page 3-11

How will the grab sample be collected? Will a person enter the test pit? Will sample material be collected from the bucket of the excavator? Please provide more detailed sample collection procedures. If test pit will be entered by sampler refer to comment regarding safety issues in Section 3.9 above.

Section 3.9.3,Page 3-11

SOP 140 does not cover test pit sampling. This needs to be addressed at least in this section, and in an SOP if necessary.

Section 3.9.4 Test Pit Sample Handling and Analysis, Page 3-11

The laboratory parameters for test pit analyses is confusing. Will the samples be analyzed for the subsurface soil parameters listed in table 1 and for TCLP analyses or only TCLP analyses. If the samples are to be analyzed only for the TCLP analysis, provide an explanation why the samples will not be tested for subsurface soil parameters.

Section 3.10, Page 3-12

This section is like previous sections, whereas it relies too heavily on SOPs. Please see previous comments.

Section 3.11, Page 3-13

Comments for this section is similar to previous sections, in that greater detail is required in the body of this section, not just references to the various SOPs.

For the higher trophic level species, both a predator species and a bottom feeder need to be collected. A bottom feeding species is noted as a ROC in 4.2.2.6.4 in the RI/FS Work Plan.

Section 3.12.1, Page 3-14

Field duplicate samples should be collected at a 1 per 10 investigate sample frequency for all sample types.

Section 3.12.1, Page 3-14

MS/MSD analysis for inorganic samples is referred to as spike/duplicate analysis. A MS/MSD sample and/or a spike/duplicate sample is required 1 per 20 investigative and QA/QC samples. A MS/MSD is required for every laboratory batch. Please review the MS/MSD volume requirements with the chosen laboratory. Typically, double the normal volume is required for soil VOC analysis and no additional volume is required for any other soil or sediment analysis. Typically, triple the normal volume is required for aqueous VOC analysis and double the normal volume for all other aqueous samples.

Section 3.12.1, Page 3-14

Region V U.S. EPA does not promote the use of trip blank samples for soil VOC samples. Aqueous VOC trip blank samples should be two 40mL glass vials, not one. A temperature blank should be included in every cooler, regardless of matrix.

Section 3.12.1, Page 3-15

Equipment blanks are required for the sample type where equipment decontamination is required. If hand augers, shovels, split sampling tubes, bailers, pumps, sediment samplers, etc. will be decontaminated and reused then an equipment blank at a 1 per 10 frequency is required. The text and table 1 provide conflicting information regarding equipment blanks and should be clarified as indicated above.

This section is the first place that indicates dedicated equipment is to be used for groundwater sampling. This information should be included in the appropriate groundwater sample collection sections, and in the appropriate SOPs.

Section 3.13.1, Page 3-15

Indicate in this section how new and existing monitoring wells will be surveyed. Include the points to be surveyed for vertical control, such as the top of the PVC riser, top of the cement pad, ground surface, etc.

Section 3.13.3, Page 3-16

The reference to 3.14.1 is likely a typo, and intended to refer to 3.13.1.

Section 4.2, Page 4-3

The third bulleted item has an example of NS-SS03. According to page 4-2 the alpha code for soil should be SO. Please review the codes for surface soil, subsurface soil and test pit samples. Please provide additional examples including a field duplicate, trip blank, and MS/MSD. Will all metal aqueous samples be field filtered? If not, there needs to be some way to distinguish between filtered and unfiltered samples. The FSP does not discuss free-phase product samples. If there is the possibility that this type of sample will be collected, it needs to be detailed in sections 2 and 3.

Section 4.3, Page 4-3

This section should state that shipping procedures are in compliance with DOT regulations (49 CFR 173 to 177) and the International Air Transportation Association (IATA).

Section 5.0

This section should indicate, in the appropriate subsections, that purge water, disposable items, contaminated clothing, etc., will be disposed of as IDW, as discussed in Section 6.0.

Section 5.2.1

Distilled water should not be circulated through pumps and tubing. Distilled water should be passed through the pump once before it is considered spent. Instead of double rinse a triple rinse with distilled water is suggested.

This section should include a section detailing the use of a solvent rinse during the decontamination process when NAPL is encountered. If this is not required, it should be clearly specified and an explanation of why a solvent rinse is not required should be included. In addition, this section should be modified if low-flow groundwater sampling is to be performed. The text should detail a solvent decontamination procedure.

Section 5.5, Page 5-3

This section should be reexamined. If disposable items are to be used, then no decontamination is required. If a lower level of decontamination is to be used, the procedures and the decision making process of when to utilize minimal decontamination should be detailed.

Figure 2

The text in section 2.1.1 states that soil samples will be collected in unpaved areas around the former MGP facility. There are several areas that are identified as paved areas between the red outlined area at the corner of St. Claire Street and 3rd Avenue and the residential area and main office. However, there are no other paved areas represented. Eight soil samples across this area does not seem sufficient to characterize the area. Why were the samples not chosen on a random grid? Figure 2 needs to detail the actual AC (area of concern) area. Figure 2 also needs to have its legend detail what the green dashed lines indicate. Are the areas outlined in red existing buildings or historical locations?

Appendix A General Comment

All SOPs should include proper PPE in the Equipment Needed section.

Appendix A SOP 100 - Water Level Measurement

The use of a steel or fiberglass tape with a "popper" weight is an inappropriate water level measurement technique. Please specify that a electrical tape, calibrated to $\pm$ 0.01 feet will be used. It is assumed that NAPL interface measurements will be made at the same groundwater water level measurements will be made. Please refer to SOP 270 - Non Aqueous Phase Liquid Measurement within this SOP. In addition, decontamination procedures are detailed within this SOP. Please delete the discussion concerning decontamination and refer to SOP 190 - Decontamination of Sampling Equipment.

Appendix A SOP 140 - Soil Sample Collection

Section 1.0 should include hollow stem auger as a means of subsurface soil sample collection. A Figure 4 is referenced on page 4, but is not included. Please include this figure. Section 3.2 does not mention field screening procedures. Please reference SOP 260 - Field Screening Procedures in this section. Samples analyzed for VOCs should be collected using EnCore sampling devices, which negate the need for field preservation using methanol. If field preservation using methanol is used, the samples should be preserved immediately following collection, in accordance with method SW846 Method 5035. The type of laboratory supplied sample containers for methods other than VOCs should not be specified within the SOP.

This SOP needs to indicate that samples will be collected for head space readings, in accordance with SOP 260.

Appendix A SOP 150 - Groundwater Sample Collection

The first section of this SOP indicates that it is written for groundwater sampling with a bailer. Latter information refers to pumps, and a whale pump is listed in the equipment. This SOP should be revised to include information regarding submersible pumps, should they be used in sampling. Any reference to a whale pump should be removed from this SOP, as this is not an acceptable sampling pump. Number 8, under Operating Procedures, indicates that the well will be purged dry a second time if "time permits." As noted earlier, this should be changed to indicate that the well will be purged dry twice prior to sampling. A method of low-flow groundwater sampling is highly recommended. Please consult the U.S. EPA guidance document on low-flow groundwater sampling procedures available at www.epa.gov/ahaazvuc/download/issue/lwflw2a.pdf.

SOP 150, Form 150-A

If the form is to be used for groundwater sampling it should be modified so that multiple pH, temperature, conductivity, turbidity, and dissolved oxygen can be recorded. The form does not even include a place for dissolved oxygen measurement documentation.

Appendix A SOP 160 - VOC, SVOC, and Inorganic Sample Collection

Section 4.1 #4 should state that the sample vial should not be overfilled, to prevent loss of the sample preservative. Groundwater sampling methods should be collected using low-flow sampling procedures. Please see comment on SOP 150. EnCore sample collection devices can be used for the collection of soil VOC samples. Please see comment on SOP 140.

Appendix A SOP 170 - Field Filtering Groundwater Samples

The SOP should be revised to reflect the use of low-flow sampling procedures. Please see comment on SOP 150.

Appendix A SOP 180 - Quality Control Sampling

The SOP should state that other types of QC samples will not be used for MS/MSD samples. Trip blanks should only be used when aqueous VOC samples are collected. Equipment rinsate blanks should be collected on a 1 per 10 basis for each sampling device used (excluding disposable sampling devices).

The volume for MS/MSD analyses is inconsistent with text in 3.12.1. Please revise both sections for consistency.

SOP 189 5.4 Duplicates, Page 4 of 4

The frequency for duplicates is inconsistent with the text in section 3.12.1. The FSP text does not discuss level C, D, and E analyses. Please revise for consistency.

Appendix A SOP 190 - Decontamination of Sampling Equipment

The SOP should include a section detailing the use of a solvent rinse during the decontamination process when NAPL is encountered. If this is not required, it should be clearly specified in the SOP and an explanation of why a solvent rinse is not required should be included.

Appendix A SOP 200 - Summa Canister VOC Sample Collection

Form 170-A - Canister Sampling Collection Form has the incorrect SOP number included in the header. The correct SOP number (SOP 200) should be included in the header.

Appendix A SOP 210 - Shipping Environmental Samples

The SOP should ensure that shipping procedures are in compliance with DOT regulations (49 CFR 173 to 177) and the International Air Transportation Association (IATA). If the SOP in it's current state is in compliance with these regulations, the regulations listed above should be cited within the SOP.

The second sentence states that head space should be left in all samples except VOAs. This is inconsistent with SOP 140 and SOP 160. Please revise for consistency. In addition, SOP 210 should state that all packing and shipping will be in accordance with current U.S. DOT and IATA regulations. SOP 210 should also include temperature blanks in all coolers to ensure proper sample temperature upon receipt at the laboratory.

Appendix A SOP 220 - Decontamination of Heavy Equipment

The SOP should include a section detailing the use of a solvent rinse during the decontamination process when NAPL is encountered. If this is not required, it should be clearly specified in the SOP and an explanation of why a solvent rinse is not required should be included.

Appendix A SOP 230

The fish should be similar size so that the smallest individual in the composite and the smallest of the individual specimens is no less than 75 percent of the total length (size) of the largest individual.

As a means to collect more investigative samples, the remaining carcass of the filleted fish can be weighed and analyzed, and these results combined with the fillet results.

Fish should be collected in late summer/early fall to increase the probability that the fish collected are resident, rather than migratory.

Appendix A SOP 240 - Sediment Sampling for Toxicity Testing and Benthic Community Analysis

The collection of sediment samples using a coring device is preferred to sample collection with a ponar sampler. Ponar samplers disturb sediment stratigraphy much more than sediment coring devices. Sediment coring devices allow proper characterization of the depths and types of different strata within the sediment and ensure that cross contamination does not occur across these different strata.

Appendix A SOP 250 - Sediment Sampling for Chemical and Physical Parameter Testing

This SOP identifies EnCore samplers in the equipment list; however, the procedure indicates that sediment will be homogenized prior to sample collection. This is an unacceptable procedure for collection of VOC samples, which need to be collected as soon as possible after retrieving the sample, and prior to sample homogenization.

Appendix A SOP 260 - Field Screening Procedures

The SOP states that "background air will be used to zero the instrument". Please clarify this statement. A zero-air gas in conjunction with isobutylene should be used to calibrate the PID. The SOP should state the method of inserting the PID probe. Will the probe be inserted as the bag is opened or will the probe be used to puncture a hole in the bag?

Appendix A SOP 270 - Non Aqueous Phase Liquid Measurement

The alternate measurement methods included in Section 4.2 should not be used. Please delete theses alternate methods from the SOP.

The Alternate Measurement Methods can be of informative value; however, these should not be used to quantitatively evaluate the thickness of NAPLs.

Appendix A SOP 290 - Vibracore Sediment Sampling

Sediment cores contained within liner should not be extracted using piston-type extruder. As the core progresses out of the liner, cross contamination can occur from residual material left on the inner surface of the liner. Cores should be extracted by one of the liner cutting methods presented within the SOP. EnCore sampling devices are again recommended for the collection of VOC samples.

Table 1

Other MGP-related constituents not include in table are sulfide, thiocyanates, ammonia, and nitrate. Equipment blanks for all samples should be on a 1 per 10 frequency based on number of investigative samples. MS/MSD samples should be on a 1 per 10 frequency based on number of investigative and QA/QC samples. The analytical method column that has PID in each space should be changed to field parameter or field measurement, not analytical method. Please review the sample container requirements with the laboratory. Soil SVOC, cyanide, chromium, and metal samples are not typically collected in 60-mL glass or plastic jars. Each of these analyses typically require an 8 oz glass jar. Please confirm that the 335.4 method for cyanide will be utilized for the soil samples as opposed to one of the SW846 9000 series. If mercury is be analyzed in the soil or water samples under the "all other metals", then the holding time should indicate 28 days for mercury. Please confirm that TCLP cyanide will be analyzed for the test pit soil samples. Reactive cyanide is the typical disposal parameter analyzed for disposal.

HEALTH AND SAFETY PLAN

General Comment

There are some references to appendices and attachments in the plan which does not correspond directly with the existing plan attachments.

Specific Comments

For the specific comments the regulatory requirements are regular type and WESTON's comments are in *italic*.

OSHA, 29 CFR 1910.120(b)(1)(ii)(c) requires development of site-specific health and safety plans for worker protection at hazardous waste sites. OSHA, 29 CFR 1910.120(b) defines the required contents of the site-specific HASP as follows:

(b)(4) Site-Specific Plan - Must address the safety and health hazards of each phase of site operation and include requirements and procedures for employee protection. As a minimum, the site HASP must address the following:

- (ii)(A) Hazard analysis for each task

A project hazard analysis has been found in Section 1.0 of the plan. Additional information regarding the collection of fish tissue and field surveying should be added to the plan.

- (ii)(B) Employee training

Training appears to have been addressed in Section 13.1 of the plan. However, it does not appear that employees who operate a boat are required to have training under this plan.

- (ii)(C) PPE to be used for each site task

The plan appears to reference appropriate personal protective equipment (PPE) in Section 1.0 and Section 7.0.

- (ii)(D) Medical surveillance requirements

Medical surveillance appears to be addressed in Section 13.1 of the plan.

- (ii)(E) Frequency and types of air monitoring including instrumentation to be used, methods of maintenance and calibration

Instrumentation and Action Levels can be found in Section 1.0 of the plan. Frequency of air monitoring is appears to be addressed in Section 6.0 of the plan.

- (ii)(F) Site control measures

Site control appears to be addressed in Section 9.0 of the plan.

- (ii)(G) Decontamination Procedures

Decontamination appears to be addressed in Section 10.0 of the plan.

- (ii)(H) Emergency response plan

Emergency response appears to be addressed in Section 12.0 of the plan.

- (ii)(I) Confined Space Entry Procedures

Confined space entry has not been addressed in the plan. Entry into the test pits could be considered to be confined space entry issue.

- (ii)(J) Spill containment program

Spill containment appears to be addressed in Section 12.8 of the plan.

- (iv) Effectiveness of site safety and health plan

A provision for review of the plan is found in Section 14.0.

In summary, this HASP (with the exception of the above comments) appears to meet the requirements of a site-specific HASP as defined by 29 CFR 1910.120(b)(4).

COMMENTS ON QUALITY ASSURANCE PROJECT PLAN (QAPP)

The QAPP will have to be revised in the context of the work plan and field sampling plan revisions. However, please note the following comments on the current version of the document:

The submitted document is not a revision 2 of the previous QAPP. This is an initial revision (revision 0) of the new document describing in comprehensive detail the necessary quality assurance (QA), quality control (QC), and other technical activities that must be implemented for the entire RI scope. Please reflect these changes on the cover page and document control format.

Title and Approval Page and Distribution list are missing in this revision of the QAPP.

A summary table with the Project action (requirements) limits, achievable laboratory detection and reporting limits for all analytes and compounds in all matrices (soil, water and etc.) should be provided (use the Table 1 in the Attachment A of the "Instruction on the preparation of a Superfund Division Quality Assurance Project Plan" as an example.)

All SOPs for the sediments from a designated subcontract laboratory should be submitted to the EPA for the review before any sample collection.

Page 6-1. Paragraph 6-2. Data package TSA.
Group of the different laboratories Nothern Lake Service (NLS), Severn Trent (STL), a URS and future subcontract lab will participate data generation in this project. Which activities are covered by this paragraph?

Page 7-3. Paragraph 7.1.4 Data Validation. Please explain how the data review and verification will be organized in this project to meet the Superfund requirements (page 60 of 68 "Instruction on the preparation of a Superfund Division Quality Assurance Project Plan": a 100% laboratory data validation must be performed by an entity independent of the laboratory).

Table 1. Please explain how the laboratories' detection limits are equal preliminary remediation goals (PRGs)

Table 8. Please correct the typo in the % recovery column for the Anthracene in water for the PAHs measurements. Please correct the typo in the % recovery column for the Mercury in soil analyses.

Please specify what kind of special training and certifications this project requires for all responsible personnel.

Appendix A. All URS SOPs should be signed by those who prepared, reviewed and approved them.

Please include the list of SOPs submitted to the QAPP from each laboratory.